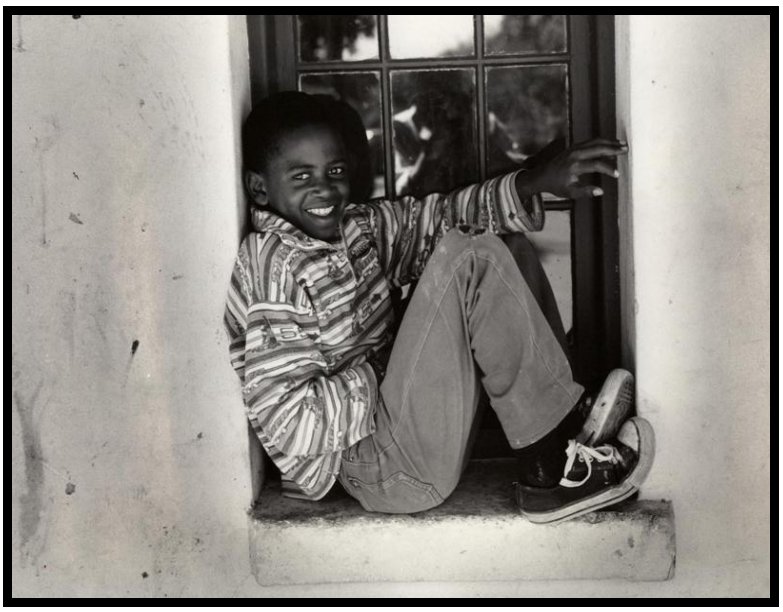
SCHOOL OF CHILD & ADOLESCENT HEALTH

UNIVERSITY OF CAPE TOWN

ANNUAL RESEARCH DAYS 2007



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Programme and Abstract Book

23rd & 24th October
ICH Building, 7th Floor
Red Cross Children's Hospital

CPD Points

Tuesday, 23rd October 2006 ***4 points***
Wednesday, 24th October 2006 ***7 points***

Please sign the attendance register on both days to claim your points.

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Title: **INTENSIVE CARE OUTCOMES OF HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTED CHILDREN IN A DEVELOPING COUNTRY**

Authors: Shamiel Salie, Andrew Argent

Department: Paediatric Intensive Care Unit, Red Cross Children's Hospital, Cape Town, South Africa.

Introduction: In the Western Cape there are currently about 22 paediatric intensive care beds serving a population of approximately 3 million people, with about 40% under 14 years of age. HIV infected children are often denied access to intensive care on the basis of a perceived poor outcome and limited resources.

Objective: Describe the clinical course and outcome of HIV infected children admitted to our Paediatric Intensive Care Unit (PICU), despite these constraints.

Method: A retrospective audit of all PICU admissions between October 2005 and October 2006. Data were collected from our PICU database and clinical records.

Results: A total of 1218 children were admitted to PICU over the 13 month period.
Seventy-nine children were identified as HIV exposed or infected. Twelve of these children were HIV infected on admission, of which 6 were on HAART. Fifty-three children were known to have positive HIV antibody tests on admission, only 24 were HIV infected and 10 children had no confirmatory testing. Of 14 children with no pre-admission HIV testing, 8 were HIV infected, 5 HIV antibody exposed but not infected and 1 positive for HIV antibodies, but had no confirmatory test.
A total of 43 HIV infected children had 44 admission episodes.
The median age was 3 months (range 0 – 51 months). Thirty-one (70%) of the admissions were for respiratory failure and organisms isolated were Pneumocystis *jirovecci* 8, Cytomegalovirus 5 and Adenovirus 2.
The median number of ventilator days were 4(range 0 – 23 days) and the median number of PICU days were 4.5(range 1 – 23 days).
Predicted PICU mortality (PIM 2) was 0.29. Thirty-two children (74%) survived to PICU discharge, but only 22(51%) survived to hospital discharge, with 2 currently in hospital 2 months post PICU discharge.

Conclusions: Nearly three quarters of HIV infected children survived the PICU admission, but only half survived to hospital discharge. The PICU outcome of HIV infected children in our unit is comparable with that of published data from the United Kingdom. However, patients were discharged early from our PICU and not readmitted if they subsequently deteriorated clinically, directly influencing PICU and hospital mortality rates. We have no record of children denied PICU admission, but relative to previous data, our PIM 2 score is lower, suggesting the sickest children are being excluded.

Title: **PERFORMANCE OF A T-CELL BASED ASSAY FOR THE DIAGNOSIS OF TUBERCULOSIS IN HIV-INFECTED CHILDREN**

Authors: Mary-Ann Davies[1,4], Tom Connell[1,2,3], Kathy Wood[1], Sandy Pienaar[1], Christine Johannisen[1], Heather Zar[1], Mark Nicol[3], Katalin Wilkinson[3], Robert Wilkinson[3], Nigel Curtis[2], Brian Eley[1] and David Beatty[1]

Department: [1] School of Child and Adolescent Health, University of Cape Town, South Africa, [2] Infectious Diseases Unit, Department of General Medicine, & Murdoch Children's Research Institute, Royal Children's Hospital Melbourne, Australia, [3]Institute of Infectious Diseases and Molecular Medicine, Faculty of Health Sciences, University of Cape Town, South Africa, [4]School of Public Health and Family Medicine, University of Cape Town, South Africa

Background: Tuberculosis (TB) is a neglected disease in children; however, of the 8.3 million cases of active TB disease worldwide in 2000, almost 1 million occurred in children. The diagnosis of TB in children remains particularly problematic, especially in those co-infected with HIV due to difficulty in obtaining appropriate microbiological specimens, low yield of acid-fast staining of smear specimens resulting in delayed diagnosis, and poor sensitivity and specificity of tuberculin skin tests (TST). The discovery of *Mycobacterium tuberculosis* (MTB)-specific antigens has led to a significant new avenue for diagnosis. Promising enzyme-linked immunospot (ELISPOT) assays have been developed that detect *in vitro* production of interferon gamma (IFN-γ) by T cells in response to these antigens. However, there are limited data on the use of these assays for the detection of tuberculosis in young HIV-infected children.

Objectives:

- To determine the sensitivity and specificity of ELISPOT in diagnosing active TB in young HIV-infected children.
- To assess the effect of age and the degree of immune suppression on IFN-γ secretion by T-cells in response to MTB-specific antigens.

Methods: Three groups of children were recruited: HIV-*infected* children with suspected TB (n=101), HIV-*infected* children without TB (n=37) and HIV-*uninfected* children without TB (n=49).All children with suspected TB underwent a TST and chest X-ray and had at least 1 induced sputum specimen or 2 gastric washing specimens sent for TB microscopy and culture. All children diagnosed without TB were followed clinically to confirm this assessment. An ELISPOT assay was undertaken on all children, and HIV-infected children had a concomitant CD4 count. A final diagnosis of definite, probable, possible or not TB was assigned according to WHO criteria using clinical and microbiological evidence, and compared with results of the ELISPOT assay.

Results: The median age of the 187 children was 20 months (IQR: 10 – 53). Definite or probable TB was diagnosed in 43% of the children with suspected TB. ELISPOT assays yielded determinate results in 93% of children, and were significantly more sensitive than TST for definite or probable TB (ELISPOT 71% (95% CI: 56 – 86) vs. TST 31% (95% CI: 14 – 48), p=0.0008). There was no significant difference in specificity between ELISPOT and TST. In contrast to TST where sensitivity was lower in those younger than 2 years of age (15%) or with severely immune suppression (CD4 < 15%) (0%), ELISPOT sensitivity was unimpaired by these factors and was 65% and 77% in each of these respective subgroups.

Conclusion: The sensitivity of an ELISPOT assay for the diagnosis of TB in HIV infected children is reasonable (71%) and higher than TST. In contrast to TST, the performance of an ELISPOT assay appears relatively unimpaired by young age and severe HIV infection.

Title: **HIV-ASSOCIATED MALIGNANCY AT RED CROSS CHILDREN'S HOSPITAL**

Authors: A Davidson, F Desai, M Hendricks, J Nuttall, B Eley, P Hartley

Department: Haematology / Oncology and Infectious Disease Services
Red Cross Children's Hospital
School of Child and Adolescent Health
University of Cape Town

Objective: To review the epidemiology, clinical presentation and chemotherapy response of children presenting to the Red Cross Children's Hospital Oncology Unit with HIV-associated malignancy .

Methods: A retrospective analysis was performed on all children diagnosed with HIV-associated malignancy at the Red Cross Children's Hospital. Data was obtained from Tygerberg Hospital and the Burden of Disease Research Unit in order to derive the incidence rate of HIV-associated malignancy for the Western Cape.

Results: Twenty children were diagnosed with HIV-associated malignancy between January 2003 and June 2007. Age at diagnosis ranged from 1.82 to 15.25 years, with a median age of 6.76 years. Twelve patients (60%) had B-cell disease, seven had Kaposi Sarcoma (35%) and one child presented with mixed-cellularity Hodgkin's disease. Nineteen were Western Cape residents.

Among the patients with B-cell disease, two had leukaemia, two central nervous system (CNS) disease, five abdominal disease and three presented at unusual sites. Two patients were already on highly-active antiretroviral therapy (HAART) - both were deemed unfit for chemotherapy because of severe chronic lung disease. All but one of the six treated with chemotherapy were started on HAART therapy. Four of these achieved and remain in complete remission. The only patient with a primary CNS lymphoma responded to HAART only.

Of the seven patients with Kaposi Sarcoma, three had a pharyngopalatal primary and four were inguinoscrotal. All the patients were commenced on HAART at diagnosis. One succumbed to disseminated disease, one was lost and two responded to HAART only. Two of the three who required chemotherapy remain in complete remission.

During this same period two children were diagnosed with HIV-associated malignancy at Tygerberg Hospital. That gives an incidence rate of 6 cases per year, or 0.55 per 1000 HIV-positive children per year in the Western Cape (based on a 2006 estimate of 11000 children with AIDS in the Western Cape).

Conclusions: With universal access to HAART and good supportive care, HIV-associated malignancies may respond favourably to chemotherapy. Severe co-morbidity and disseminated malignancy are relative contraindications to active treatment. The relatively low incidence probably represents a combination of underascertainment and the effect of HAART.

Title: **A COMPARISON OF SCORING SYSTEMS FOR THE DIAGNOSIS OF TUBERCULOSIS IN INFANTS AND CHILDREN**

Authors: Monique Hanslo, Mark Hatherill, Tony Hawkridge, Francesca Little, *Larry Geiter, Greg Hussey, and the SATVI BCG Trial Team.

Department: South African Tuberculosis Vaccine Initiative (SATVI), University of Cape Town, and *Aeras Global TB Vaccine Foundation

Objective: An evidence-based approach is needed for diagnosis of childhood tuberculosis (TB) as the endpoint for trials of novel TB vaccines in countries with limited resources. Several TB scoring systems for diagnosis and treatment have been proposed for use in developing countries with high prevalence of TB. Diagnosis is based on various combinations of bacteriological, radiological and clinical information, resulting in binary or hierarchical outcomes, or classification based on numerical results. This study compares the number of TB cases diagnosed and measures of agreement using 9 different diagnostic scoring systems.

Methods: The database of a Phase IV BCG vaccine trial (n=11680) was used to analyse 1445 case episodes of suspected TB, among children under 2 years of age who were admitted to a Case Verification Ward for diagnostic work-up (March 2001 - August 2006). TB diagnosis was made using an in-house diagnostic algorithm based on comprehensive clinical, radiological, and bacteriological data. This diagnostic algorithm and 8 other scoring systems were compared in terms of % positive TB cases diagnosed and agreement between systems using kappa statistics. Scoring systems with hierarchical classifications were compared with regards to % cases diagnosed as Not, Possible, Probable and Definite TB cases. Weighted kappa statistics were calculated as a measure of agreement between diagnoses produced by the hierarchical scoring systems. Numerical scoring systems were compared and optimal cut-off points investigated.

Results: Percentage of positive TB cases ranged from 7% to 90% of cases investigated depending on the scoring system used. Comparing binary classification of TB or Not TB, agreement between systems using bacteriological and radiological and clinical source data was Fair to Good (kappa=0.38-0.71). Distribution of hierarchical classifications differed markedly across diagnostic approaches. Difference in the shape of this distribution between scoring systems was not always associated with poor agreement. Agreements between scoring systems using hierarchical diagnostic classifications (kappa=0.40-0.80) were higher than those obtained using binary classifications (kappa=0.02-0.71). Percentage of positively diagnosed TB cases ranged from 10% to 79% using numerical scoring systems. The optimal cut-off point that maximized agreement between diagnoses produced by the SATVI algorithm and each numerical scoring system was shown to be the median value.

Conclusions: Diagnosis of childhood TB using nine different scoring systems produces highly variable numbers of TB cases. Agreement between binary, hierarchical, and numerical scoring systems is dependent on the type of source data. The number and type of TB cases diagnosed in a tuberculosis vaccine trial will depend on the features of the diagnostic system used to determine that endpoint.

Title: **EVALUATION OF A SCHOOL-BASED HIV INTERVENTION**

Authors: Alan J Flisher, Wanjirũ Mũkoma, Landon Myer, Catherine Mathews, Knut-Inge Klepp, Leif Edvard Aarø

Objective: This study evaluated the effects of a HIV prevention intervention on the delay of sexual intercourse and condom use.

Methods: A cluster randomised controlled trial design was employed. Twenty six public high schools in Cape Town were randomised to either the intervention or delayed intervention group, 13 schools in each group. Six thousand three hundred and sixty four learners were enrolled in the baseline survey. The participants were grade 8 students, mean age 14 years. The intervention was delivered by teachers over a 6 month period. Self administered anonymous questionnaires were completed at baseline, 6- and 15-months. Pairwise analyses were conducted on data from the cohort of students (N=3625) who completed the questionnaire at baseline, first and second follow-ups. The primary outcomes were delay of sexual intercourse and condom use. Secondary outcomes included communication regarding HIV/AIDS, sexual and violent behaviour; and theoretical constructs, including knowledge about HIV/AIDS, self–efficacy and perceived susceptibility to sexually transmitted diseases. The study was designed to have 80% power to detect to detect a 50% reduction in the annual incidence of sexual intercourse and an increase in the prevalence of condom use at last sex from 38% to 50%.

Results: There were no differences between the intervention and control groups at baseline. The intervention did not have an effect on either the delay of sexual intercourse (OR = 1.00; CI [0.85 to 1.18]), or condom use (OR = 1.21; CI [0.92 to 1.59]). There were no intervention effects on the primary outcomes when the data were adjusted for age, gender and socioeconomic status.

Discussion: The possible explanations for the intervention's failure to change behaviour, methodological issues and implications for the evaluation of school-based interventions will be discussed.

Title: **WHICH RESORT? AN EMPIRICAL STUDY OF RESIDENTIAL CARE FOR CHILDREN IN SOUTH AFRICA**

Authors: Helen Meintjes, Sue Moses, Lizette Berry & Ruth Mampane

Department: Children's Institute, UCT and Centre for the Study of AIDS, UP

Objective/Study rationale: In the context of a burgeoning AIDS pandemic, there exists widespread concern both internationally and locally that a proliferation of orphanages is occurring across South Africa, in response to increasing orphan numbers. This unease about the 'mushrooming' of residential care facilities emanates from perspectives that care for children – orphaned or otherwise – by relatives or others in a 'home' and 'community' environment is the ideal. In contrast, residential care is for a variety of reasons widely viewed as the 'last resort' in response to the care needs of these children – a position that is shared by the South African government and other key players in the child welfare sector.

There remains however a dearth of academic or empirical research into the phenomenon of residential care in South Africa. Where studies do exist, there is a tendency to focus attention on 'conventional' forms of institutions: large, formal, top-down interventions which characteristically involve the removal of children from their home 'communities'. However the residential care sector is constituted by a far more diverse set of group-care arrangements.

This study therefore aimed to provide evidence for the policy debates by exploring the complex patterning of residential care provision in South Africa, and its relationship to international child welfare policy, and South African policy and law.

Method: Primary research was conducted in four research sites in four provinces, with sites providing a rural/urban/peri-urban spread. In-depth qualitative interviews were conducted with those running and providing childcare in 34 children's homes (including registered, unregistered and state facilities). This was augmented by in-depth interviews with social service providers in each site. In addition to interviews, 28 of the homes completed an audit of children resident at the time of the interviews.

Results: The situation of residential care 'on the ground' in South Africa was demonstrated to be much more complex than is acknowledged in policy discourse and debate. Residential care settings for children vary substantially across multiple axes, and in many instances negative features associated with residential care settings do not apply.

Questions are also raised about the use of registration as a marker of quality of care, as the application of registration requirements is demonstrated to favour the establishment of more conventional institutions and to undermine some of the more positive aspects of community-based residential settings by shifting them towards care of a more stereotypically institutional nature.

Conclusions: Given the extent of heterogeneity in the residential care sector, the inherent focus in policy on conventional institutional forms seems misplaced in the South African context. The study findings illustrate the blurring of boundaries between family-based, community-based and residential care, and raise questions about the usefulness of a categorical distinction between the 'first' and 'last resorts' as well as of the current legal definition of residential care.

The results point to the need for flexibility in our policy and law to enable the wide variety of informal social care responses to be both resourced and regulated. Policy and legislation based on conventional notions of what residential care is and should be runs the risk of being unhelpful and inappropriate.

Title: **INFECTIONS IN THE NICU**

Author: Clarissa Pieper

Department: Neonatology

Background: Infections in NICU is a major risk for newborns. A 10-25% nosocomial sepsis rate is "the norm" in most NICUs. Low birth weight is the most important factor. Babies are at risk because of a myriad of factors like their reduced immune status, the environment, colonisation, feeding and antibiotic use.

Aim: To describe the possible factors leading to proven infections in the NICU.

Methods: All babies that were admitted to the NICU during Jan-July 2006 were enrolled as a prospective cohort measuring all possible aspects relating to infections and susceptibility to infections, using a validated database: INSURF.
Infections were defined by positive blood cultures, line cultures and pus swabs.

Results: 225 Babies were enrolled. Their mean birth weight was 1751.8g (695-5000) and mean GA: 33.2 wks (26-40). They had a mortality of 3%, a positive culture rate of 15% and a blood culture pos rate of 9%.
189 had no proven infections, 20 (8%) had one organism cultured, and 15 (6%) had >1 organism cultured.
Klebsiella was the most common organism (28%). The only positive predictor of sepsis was percutaneous lines.

Discussion: There were no definite indicator except percutaneous lines. These may only be an indicator of severity of disease more than causality. Further analysis is needed

Title: **LITERATURE REVIEW OF ROTAVIRUS PREVALENCE STUDIES IN AFRICA**

Authors: Zainab Waggie, Anthony Hawkridge, Gregory Hussey

Objective: The objective of this study is to review the trends in the prevalence of rotavirus (RV) infection in Africa over the last 30 years: 1975 to 2006

Methods: Eligible studies were identified from 3 independent multilingual Medline searches, restricted to studies in humans. The search was further refined by using the following criteria: studies including children less than 5 years of age, with data on more than 50 children, and having an observational period of more than 3 months. The data was analyzed in four time periods: ALL (1976-2006), 1976-1985, 1986-1995, and 1996-2006. The results are presented as totals, percentages and interquartile ranges (IQR).

Results: The initial search identified 206 studies from 27 countries in the period 1976-2006. With refinement 101 studies from 22 countries remained, and formed the basis of this review. The main results are presented in Tables 1 and 2. Of these studies: 58 (57%) were hospital based, 25 (25%) were outpatient studies, and 18 (18%) was combined studies. Rotavirus was detected in 25% [IQR: 16-32] of children with diarrhoeal disease, with a rise in prevalence to 28% in the last 10 years. When multiple diarrhoeal agents were tested for; rotavirus was the commonest agent detected in 73% of studies, with a rate of 89% in the last 10 years. RV disease showed an autumn/ winter seasonality in 38% of studies, 36% had a predilection for the dry season, and 10% in the cool season.

Table 1: Analysis in 4 time periods

Study characteristics	ALL	1976-1985	1986-1995	1996-2006
No. of studies	101	16	54	31
Duration (months)[median (IQR)]	12 (8-18)	12 (6.8-12)	12 (8-13.5)	13.5 (11.3-24)
Total no. children	48 501	5 808	26 070	16 623
Total no. RV positive	11 954	1 421	5 857	4 676
% RV positive [IQR]	25% (16-32)	25% (16-31)	23% (16-29)	28% (17-34)
Multiple agents tested (no. studies)	44	12	23	9
RV commonest agent	32	7	17	8
% commonest agent	73%	58%	74%	89%

Table 2: Analysis by setting

Analysis by setting: ALL	Hospital	OPD	Combined
No. studies	58	25	18
Total no. children	27 588	9 856	11 057
Total no. RV positive	6 846	1 581	3 527
% RV positive	25%	16%	32%

Conclusion: Rotavirus is responsible for 28% [IQR= 17-34] of diarrhoeal cases in Africa in the last decade. It causes a significant disease burden. With the availability of effective and safe vaccines that prevent moderate and severe disease, hospitalization and mortality is preventable through vaccination.

Title: **COMPLIANCE WITH HAND HYGIENE GUIDELINES AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL**

Authors: Whitelaw AC[1,2], Blake T[3], Rinquest C[3] on behalf of the Red Cross Children's Hospital Infection Control Committee

Department: 1: National Health Laboratory Service
2: Department of Clinical Laboratory Sciences, University of Cape Town
3: Red Cross War Memorial Children's Hospital

Introduction: Infection with antibiotic resistant organisms is an increasing concern worldwide, given the increased morbidity, mortality and financial costs associated with these infections, as well as the paucity of new antibiotics with which to treat the infections. There is increasing reliance on infection control precautions to prevent transmission of multi-resistant organisms in hospitals. One of the cornerstones of infection control is hand hygiene. However, adherence to hand hygiene is still poor. This study was conducted to determine the level of adherence to hand hygiene recommendations at Red Cross Children's Hospital as part of a hand hygiene education campaign.

Methods: A dedicated nursing sister observed hand hygiene practices in all wards at the hospital. Two hours were spent in each ward, and every interaction between a health care worker (HCW) and patient or patient's environment was classed as one episode. The observer recorded whether the HCW either washed or disinfected his/her hands. Use of either hand wash or hand rub were taken as evidence of adherence to hand hygiene guidelines.

The results were broken down by category of HCW, nature of the contact and by location. It was only possible to analyse results for medical and nursing staff, as there were too few interactions with other staff categories for meaningful analysis. The nature of the contact was broken down into direct patient contact, contact with body fluids, and contact with the environment.

Results: Compliance with hand hygiene was noted for approximately 60% of the patient contact episodes. Compliance before body fluid contact ranged from 44% (among all HCWs) to 55% (among nurses). Compliance after contact with body fluids was significantly better (93% and 91% for all HCWs and nurses respectively). This is understandable, and probably reflects the feeling of "being dirty" after touching body fluid. Hand hygiene compliance when interactions only involved inanimate objects was poor (35%-41% for all HCWs), which is not surprising. This suggests that HCWs believe that inanimate objects are not an infection control hazard.

Conclusion: Hand hygiene compliance prior to contact with a patient is adhered about 60% of the time, which is in keeping with international experience. Certain areas need to be targeted in order to improve compliance; these include hand hygiene pre-body fluid contact, as well as compliance when in contact with inanimate objects. A hand hygiene education campaign has been launched at the hospital and it is hoped that this will go some way to improving the situation.

Title: **IL-17 AND IL-22-PRODUCING CD4$^+$ T CELL SUBSETS ARE DISTINCT AND CONTRIBUTE TO THE HUMAN ANTI-MYCOBACTERIAL IMMUNE RESPONSE**

Authors: Thomas J. Scriba, Barbara Kalsdorf, Debbie Abrahams, Fatima Isaacs, Jessica Hofmeister, Gillian Black, Hisham Y. Hassan, Robert J. Wilkinson, Gerhard Walzl, Sebastian Gelderbloem, Hassan Mahomed, Gregory Hussey, Willem A. Hanekom

Department: South African Tuberculosis Vaccine Initiative, University of Cape Town, Cape Town, South Africa, 7925

Objective: IL-17 has been characterized in mice as a mediator in the balance between protective immune responses to *Mycobacterium tuberculosis* and destructive inflammation. IL-17 and another pro-inflammatory cytokine, IL-22, remain unexplored in human mycobacterial infection. We studied the role of the novel cytokines IL-17 and IL-22 in the human immune response to mycobacteria.

Methods: Whole blood from healthy mycobacteria-exposed adults and patients with pulmonary tuberculosis (TB) was stimulated with BCG, PPD for 12 hours. Brefeldin A was added for the last 5 hours. Intracellular cytokines were detected by polychromatic flow cytometry using an LSR II. Bronchoalveolar lavage was performed on healthy controls and pulmonary TB patients. Soluble cytokine was quantified in BAL fluid by ELISA. To study the effect of Th1 cytokines on IL-17 and IL-22 production by mycobacteria-specific cells, PBMC were cultured in the presence of IFN-γ or IL-12p70 or neutralising antibodies for 96 hours and soluble IL-17 or IL-22 quantified by ELISA.

Results: We detected two novel and distinct mycobacteria-specific IL-17 or IL-22-producing CD4$^+$ T cell subsets in peripheral blood of healthy adults with or without latent Mtb infection and patients with active TB. These populations were also distinct from Th1 cells producing IFN-γ, TNF-α and/or IL-2. IL-17 or IL-22-producing cells displayed phenotypes consistent with central memory cells.
In active TB patients, peripheral frequencies of IL-17 and IL-22-producing T helper cells, like Th1 cells, were significantly reduced compared with healthy controls. Moreover, IL-22 protein levels were significantly higher in bronchoalveolar lavage fluid from pulmonary TB patients, compared with healthy controls. IL-17 protein was not detected in lavage fluid, possibly because IL-17 production may be inhibited by the strong Th1 response to mycobacterial infection. *In vitro* culture experiments supported this, as IL-17 production was suppressed by exogenous IFN-γ or IL-12. IL-22 was not affected by Th1 cytokines.

Conclusions: Our results suggest that the magnitude and complexity of the anti-Mtb immune response has historically been underestimated. The lower peripheral cytokine$^+$ cell frequencies in active TB patients may be due to T cell homing to the infected lung. Pro-inflammatory IL-17 and IL-22-producing cells may play important roles in TB inflammation and the human immune response to *Mycobacterium tuberculosis*.

Title: **RADIOGRAPHIC FEATURES OF PAEDIATRIC PNEUMOCYSTIS PNEUMONIA – AN HISTORICAL PERSPECTIVE**

Authors: R.D. Pitcher, H Zar

Introduction: The human immunodeficiency virus (HIV) has been noted to alter the radiological appearance of Pneumocystis pneumonia (PCP) in adults, but little is known about its impact on the chest x-ray features in children.

Aim: To determine differences between the plain radiographic features of paediatric PCP recorded prior to the emergence of HIV in 1982 and those documented in the HIV era.

To establish differences in the radiographic features of PCP documented in HIV-infected children in developed and developing countries.

Method: A Medline search of articles was conducted from 1950 to 2006, utilising the terms "Pneumocystis pneumonia in children" and "chest radiographic features" or "bilateral opacification" or "lobar consolidation" or "asymmetrical opacification" or "pneumatocoeles" or "cavities" or "pneumothorax" or "pneumomediastinum" or "pleural effusion" or "mediastinal adenopathy" or "nodules" or "normal chest radiography". Appropriate articles were retrieved, radiological data extracted, reference lists examined and hand searches of referenced articles conducted.

Results: Diffuse bilateral "ground-glass" or alveolar pulmonary opacification, which may show some asymmetry, has been consistently documented as the commonest radiographic finding in childhood PCP throughout the period under review.

The less common radiological features of PCP in children are similar to those in adults.

In developed countries, PCP-related pulmonary air cysts have been reported at an earlier age in HIV-infected children, compared with uninfected children.

PCP-related air cysts, pneumothorax and pneumomediastinum have been reported in children in developed but not in developing countries.

Conclusion: The radiological features of paediatric PCP documented prior to the HIV epidemic are similar to those recorded in the HIV era. Further study of the determinants of the uncommon radiographic features in children is warranted.

Title: **RESULTS OF A PHASE I STUDY EVALUATING THE SAFETY AND IMMUNOGENICITY OF A NEW TB VACCINE, MVA85A, IN HEALTHY ADOLESCENT VOLUNTEERS WITH NO EVIDENCE OF INFECTION WITH *MYCOBACTERIUM TUBERCULOSIS***

Authors: Michèle Tameris ,Tony Hawkridge, Linda van der Merwe ,Mark Hatherill,Thomas J. Scriba, Sebastian Gelderbloem, Erica Smit, Sizulu Moyo, Helen Fletcher*,Nathaniel Brittain*, Adrian Hill*, Willem Hanekom, Greg Hussey, Helen McShane*

Department: SATVI, Institute of Infectious Disease and Molecular Medicine, UCT
*Centre for Clinical Vaccinology and Tropical Medicine, Oxford University, UK

Objectives: To assess the safety of a single intradermal injection of 5 x 10^7 PFU MVA85A, when administered to healthy adolescent subjects with no evidence of infection with *Mycobacterium Tuberculosis* (*M.tb).* Secondly, to measure the immunogenicity of the vaccine in these subjects.

Methods: This is an open label Phase I safety study. Following the favourable review of three month safety data of twenty four healthy adult volunteers vaccinated with MVA85A, and with early data showing the vaccine to be highly immunogenic in adults, 12 adolescents were enrolled and vaccinated over 6 months. The following data were collected: solicited local and systemic adverse events by means of a diary card for the first 7 days and thereafter adverse events recorded at each visit; blood chemistry and haematology monitored at days 7 and 84.The sample size was judged sufficiently large to allow determination of the magnitude of the outcome measures, especially of serious and severe adverse events.

Results: There were no clinically significant changes in full blood count, serum electrolytes and liver enzymes during the trial. The most common adverse events were local, namely pain, swelling, itching, redness and scaling at the site of vaccination. Although a number of subjects complained of feeling feverish, temperatures were, in fact, not raised, with no subjects having a temperature above 37.5°C. Less than 20% of subjects had systemic adverse events including joint pain, muscle aches, malaise, lethargy, headache and nausea; this frequency was much lower in adolescents than the ~ 50% in adults. Systemic adverse events peaked at about Day 2 but had resolved by Day 7. Local adverse events were more frequent than systemic adverse events (again less in adolescents) but often resolved within 7 days. In adolescents, of the unresolved local adverse events at day 7, 12 of 15 had resolved by day 14 and the remaining 3 had resolved by day 28. There have been no serious or severe vaccine-related adverse events during the three month safety observation period of this study. The final results of the immunology studies are not yet available

Conclusions: Consenting, enrolling and following up adolescents presented challenges not experienced in adult vaccine trials. MVA85A vaccine was found to be safe in this population of TB naïve, HIV uninfected, otherwise healthy adolescents in a very high TB prevalence area. It is felt that further trials with MVA85A are justified. Enrolment will soon commence in children and infants followed by a Phase IIb efficacy trial in infants in late 2008.

Title: **WHAT CHALLENGES THE SHIFT TO FAMILY-FRIENDLY PRACTICE? – INITIAL RESULTS OF A BROAD PRACTICE IMPROVEMENT INITIATIVE AT RED CROSS CHILDREN'S HOSPITAL**

Authors: Minette Coetzee, Weez Bramwell and Anchen Verster

Department: Child Nurse Practice Development Initiative, UCT School of Child and Adolescent Health

A growing evidence base confirms that family-centered approaches improve outcomes in paediatric health care facilities. There is no single definition of *family-centered* care, but facilitating parent and professional participation in the care of children is a central concept. The approach has become widely accepted in western countries. At the Red Cross Children's Hospital it also seemed to make resource sense and is considered our social responsibility. In 2007, a shift to family friendly care became the focus of the Child Nurse Practice Development Initiative.

While the approach is conceptually sound and outcomes like decreased length of hospital stay (25%) and cost per admission decreased (between 13.5 and 29%) in some settings, there is evidence to suggest that the complexities of implementing family centered care may be minimised. Success seems to revolve around two issues: space to accommodate families and communication norms. There is also evidence to suggest that different cultural groups and social systems based on class influences improved working relationships with families.

At Red Cross Children's Hospital, small teams in various wards have been exploring their own needs and challenges to implementation. A variety of interventions like improved written communication and posters as well as regular parent staff meetings have been instituted. Yet there are still significant difficulties with shifting practice.

This paper will present a thematic analysis of data gathered in focus groups, participant observation and interviews exploring the challenges of implementing a more family centered approach at the Red Cross Children's Hospital.

Title: **LISTENING TO ADOLESCENTS TALK ABOUT ADOLESCENT-FRIENDLY TERTIARY HEALTH CARE SERVICES**

Authors: Lindiwe Mbangiwe, Minette Coetzee

Department: UCT School of Child and Adolescent Health and Division of Nursing and Midwifery

Adolescence is a critical developmental period a time in which adolescents need health services that are geared towards their needs

Aim: This study addresses adolescents' needs focusing primarily on experiences and expectations of chronically ill adolescents. It is important for health care professionals to find out from adolescents what their needs are and involve them in planning care to meet those needs. Therefore, the study aims to gain an understanding of the services that adolescents require.

Method: An interpretative descriptive qualitative design was used. The past hospital experiences of the chronically ill adolescents allowed them to reflect on the hospital environment and enabled them to discuss their thoughts and opinions in semi-structure interviews. Adolescent patients were asked about their experiences and expectations in order to understand what could improve their hospital stay. The interviews were augmented with a drawing technique. Interview data were examined using content and thematic analysis.

Setting and sample: In-depth interviews were done with six chronically ill adolescents aged between 12 and 16 years of age who were admitted at Red Cross children's Hospital at the time of the study, this was followed by 3 focus groups to increase confirmability and reliability

Findings: Five main categories emerged to describe the experiences and expectations of chronically ill adolescents. The adolescents provided clear information about what it is like to be in hospital, what they liked about the hospital and what they did not like. They are also clear about what a hospital should look like.

Relevance to clinical practice: Health professionals working with adolescents with chronic illnesses need to be aware of the needs of chronically ill adolescents. This could improve the care that these adolescents receive as it may influence because referrals to community and support services. Health professionals working with adolescents with chronic illnesses also need to ensure these adolescents have a smooth transition to adult care. An understanding of the adolescents needs could guide the transition process. Therefore, it is important to recognize and value the expertise and information that can be provided by adolescents to assist in planning services to meet their health care needs.

Title: **"TWO TRIANGLES AND A BAKER'S DOZEN"**

PSYCHO – SOCIAL SEQUELAE OF CHRONIC PHYSICAL ILLNESS IN CHILDREN AND ADOLESCENTS

Author: Dr N J Shortall

Department: Division of Child and Adolescent Psychiatry
Department of Psychiatry and Mental Health
University of Cape Town

The psychological, psychiatric and social sequelae of chronic physical illness in children and adolescents are protean in their manifestations. Clinical experience, especially with HIV / AIDS sufferers has shown these effects to be devastating in their impact on children and their carers and extremely difficult to manage. Children and adolescents function in and are influenced by three domains – family, peer group and school. The sequelae of chronic physical illness can be categorized into three "domains of effect" – reactions, restrictions and responsibilities. A collaborative and promotive working model is presented that encompasses these three domains of functioning with these domains of effect. Using the proposed model, thirteen common management dilemmas including causation, diagnosis, compliance, stigma, relapse prevention, prognosis and death can be discussed and debated with patients and their families. Essential contextual factors including culture, religion, social circumstances and the doctor-patient relationship are also discussed. Others involved in the multidisciplinary care of chronically ill children, including primary health care workers may find this approach useful. Suggestions are given as to how this schema may be adapted for use in other age groups, in managing general psychiatric conditions and in training health professionals.

Title: **OBSERVATIONAL SURVEY OF SAFETY BELT AND CHILD RESTRAINT USE – CAPE TOWN – SOUTH AFRICA**

Authors: Du Toit N, Nyakaza P, Van As AB

Department: Child Accident Prevention Foundation of Southern Africa

Introduction: Road Accidents are the most common cause of unnatural deaths of children in South Africa. Passenger deaths in children rank 4th.

Aim: The aim of this observational survey was to observe how many adults and children are restrained appropriately and to utilize the results as part of an ongoing Seatbelt Campaign during and after the First UN Global Road Safety Week.

Material and Methods: During March 2007, CAPFSA together with the Road Safety Management did an observational survey at the main entrance and crèche of the Red Cross Children's Hospital in Cape Town. Observations were done for five days from 26 – 30 March 2007at various time intervals: 6h30 – 9h00, 12h00 – 14h00 and 15h30 –16h30.

Results: A total of 2080 individuals in 1269 motor vehicles were observed. Fifty percent did not wear a seatbelt. Seventy-one percent of front adult passengers and 90 % of rear adult passengers did not wear a seatbelt. Of the 313 children observed 89% of children were not restrained at all. It was observed that only 8% of children were in a car safety seat and 3% of children had seatbelts on.

Discussion and conclusion: This observational study showed shocking results regarding the poor buckling-up of adults as well as children. Good laws, proper enforcement and continuous education are essential to reduce child passenger injuries.

Title: **A SAFER CANDLE PROJECT – Cape Town – South Africa**

Authors: D. Schulman, du Toit N, Nyakaza P, Van As AB. Rode,H

Department: Child Accident Prevention Foundation of Southern Africa

Introduction: There are two main causes of shack fires in South Africa: fallen candles or paraffin appliances These fires lead to devastating consequences and huge economic losses.

Aim/Goal: The goal of this project is to facilitate and promote safer use of candles in a glass jar, with the ultimate aim to prevent fires, burn injuries and deaths caused by fallen candles, targeting individuals and families who live in informal homes.

Material and Methods: CAPFSA and Red Cross Children's Hospital personnel conducted a number of trials to test candle with sand in a glass jar concept. During November 2006, the project was taken to an informal area that exclusively uses candles as a source of light, for the testing. Ten demonstration sessions with safety education to parents/caregivers were held at main outpatient waiting areas of the Red Cross Children's Hospital.

Results: During the knock over trials the lighted candle was extinguished by sand nine times out of ten (90%) using the glass jar. The feedback obtained from the testing in the informal area where ten households were given a period of five days to evaluate the efficiency of the candle was very positive. The idea was also well received by +-500 parents/caregivers reached during demonstration sessions conducted at the hospital waiting rooms.

Discussion and Conclusion: The idea of candle in the glass jar is very simple and preventative measure to reduce shack fires mainly caused by candles tipping. One of its advantages is that it places no financial burden on families, as it costs nothing to set up. Continuous education and involvement of other relevant stakeholders is essential to take the project further.

Candle in the glass jar with sand

Title: **EIGHT-YEAR COMPARATIVE CROSS-SECTIONAL STUDY OF PULMONARY FUNCTION IN CYSTIC FIBROSIS PATIENTS**

Authors: Brenda Morrow; Heather Zar; Andrew Argent; Anthony Westwood

Objective: To compare the pulmonary function of patients over the age of five years, managed at the Cystic Fibrosis (CF) Clinic of Red Cross Children's Hospital, between the first quarter of 1999 and the last quarter of 2006.

Methodology: The best spirometry results, based on percentage predicted FEV1, of all patients performing pulmonary function tests during the first quarter of 1999 and the last quarter of 2006 were retrospectively reviewed and compared. Data were analysed using descriptive statistics, Mann- Whitney U and chi-square tests.

Results:

Table 1: Comparative patient characteristics and pulmonary function tests.

	First quarter 1999 n = 39	**Last quarter 2006 n = 39**	***p***
Age (years)	10.8 (7.4-13.9)	11.8 (8.6-14.8)	0.1
Age at diagnosis (years)	1 (0-4)	1 (0-3)	0.5
Gender M:F	19:20	21:18	0.7
***P. aeruginosa* colonised (n (%))**	26 (67)	27 (69)	0.8
***S. aureus* colonised (n (%))**	29 (74)	24 (61.5)	0.3
FEV1 (% predicted)	61 (51-73)	81 (69-100)	**0.004**
FVC (% predicted)	63 (52-89)	82 (70-98)	**0.007**
MEF (% predicted)	40 (27-57)	62 (41-87)	**0.01**

Data are expressed as median (IQR) unless otherwise stated. FEV1 – forced expiratory volume in one second; FVC – forced vital capacity; MEF - average expiratory flow between 25 and 75% of FVC.

Conclusions: Pulmonary function test scores increased by 20% over eight years, in comparable patient groups. This may reflect improved care of children with cystic fibrosis, delivered by a multidisciplinary team.

Title: **ORAL HEALTH STATUS OF PAEDIATRIC CARDIAC PATIENTS - A CASE CONTROL STUDY**

Authors: Dr. Sobia Zafar* and SY Harnekar

Objectives: To determine the oral and dental health status of paediatric cardiac patients (study group), 12 years of age and younger, and compare them with non-cardiac patients (control group) by recording the following:

- Dental decay experience
- Developmental dental anomalies
- Plaque and gingivitis

Methods: Parents / caregiver and child pairs attending the paediatric clinics at Tygerberg Hospital were informed and invited to participate in the study. A total of 150 children, 75 with known cardiac disease (study sample) and 75 non-cardiac (control sample) were examined. The study and control groups were matched for age and gender.
The following information was recorded: the type of cardiac disease, the visible plaque deposits, gingivitis, and tooth status (dmft, DMFT and developmental enamel defects). The oral examination was done using the World Health Organization's (WHO) guidelines for basic oral health surveys (1987). No radiographs were taken.
The data was tabulated on an Excel spreadsheet and was analyzed using a commercially available statistical software package (SPSS 13.0, SPSS Inc.).

Results: The study sample consisted of 150 children. The age and gender for both the study and control groups were 40 males & 35 females with a mean age 6.5 ± 3.8 years, ranging from 1 to 12 years.
The cardiac group compared to control group generally had a higher decay component (dt =2.67 vs. 2.01 and DT = 0.43 vs. 0.29) and a lower missing component (mt= 0.68 vs. 0.99 MT= 0.01vs 0.07), but that was not statistically significant.
The developmental defects in the cardiac group were slightly higher than that in the control but the difference was not statistically significant for both the primary and permanent dentitions ($p=0.27$).
The gingival inflammation was significantly higher in the cardiac group than the control group ($p=0.04$), while the plaque scores were similar in the two groups ($p=0.14$).
For the whole sample there were strong correlations between dt and plaque scores ($p<0.01$); gingivitis and dmft ($p<0.01$); gingivitis and total caries experience ($p<0.01$).

Conclusion:

- No statistically significant difference was established in the study between the cardiac and control groups for the caries scores. The overall mean dmft /DMFT of the study correlates with the South African Oral Health Survey by van Wyk and van Wyk (2004).
- The cardiac group had a higher decay, but lower missing and filled components. This may be a reflection of the unmet dental treatment needs of the cardiac patient.
- The gingival inflammation in the cardiac group was exaggerated in comparison to the plaque deposit scores.

Title: **THE OCCLUSION OF RESIDUAL FORWARD FLOW IN THE SUBPULMONARY OUTFLOW TRACT IN PATIENTS UNDERGOING SINGLE VENTRICLE PALLIATION**

Authors: Shipton S, Zuhlke L, De Decker R, Stirling J, Lawrenson J.

Department: Paediatric Cardiolgy Service of the Western Cape. Universities of Cape Town and Stellenbosch

Residual forward flow into the pulmonary arteries in patients undergoing single ventricle palliation procedures can result in failure of the new low pressure pulmonary circulation.

Six patients (4 M, 2 F age 0.5 – 15 y) underwent cardiac catheterisation in an attempt to decrease forward flow into the pulmonary arteries and decrease PA pressure. Three patients had tricuspid atresia; the other 3 patients had 2 ventricle hearts in which a conventional repair was not possible.

Three patients were post final palliation (TCPC or Kawashima) and 3 were post recent Glenn shunt. In all patients, the procedure was successful. Various devices – plugs, duct occluders and septal defect devices were used to close the outflow tract. The procedures tended to be lengthy requiring combined femoral and jugular vein approach.

Closure of the outflow tract resulted in improvement in the clinical condition of the patient while avoiding surgery in patients with repeated thoracotomies.

Title: **FISH TESTING FOR THE 22q11 DELETION SYNDROME AT RED CROSS HOSPITAL: A RECOGNITION RIDDLE**

Authors: Rik De Decker, Mark Roussot, Ronnie Smart, John Lawrenson

Department: Division of Critical Care and Children's Heart Diseases, School of Child and Adolescent Health, University of Cape Town and Red Cross Children's Hospital, Cape Town, South Africa

Objective: After Down syndrome, the 22q11 deletion syndrome is the commonest syndromic cause of congenital heart disease, and is the commonest microdeletion known in man. It is a complex syndrome associated with a remarkably diverse spectrum of abnormalities, and 80% will have some form of congenital heart disease. Syndrome recognition is challenging due to the wide phenotypic diversity and often subtle facial dysmorphism. Fluorescent-in-situ-hybridisation (FISH) testing for the microdeletion at 22q11.2 is the current diagnostic test of choice, but is expensive. Unfortunately, the selection of patients for FISH testing remains based on imprecise clinical criteria, and those in the literature may not reflect the experience in our populations. The aim of this study was to review the clinical features which best suggest the need for FISH testing in our patient population.

Methods: A retrospective case record review of all patients tested positive by FISH testing for the 22q11.2 microdeletion since 1995 at the Red Cross Children's hospital in Cape Town, South Africa was undertaken.

Results: To the end of December 2006, a total of 512 FISH tests for the 22q11 deletion syndrome have been undertaken. A microdeletion was detected in only 66 patients (12.9%), no deletion was detected in 427 patients (83.4%) and the test "failed" in 19 (3.7%). However, in 2006 alone, 95 FISH tests were performed of which 18 (19%) were positive. The mean age of positive diagnosis in 2006 was only 2 months. This increase in the recognition of 22q11 deletion syndrome patients reflects the improved awareness and diagnostic acumen of our clinicians.

Conclusions: Since some phenotypic features are thought be population-specific, international selection criteria for FISH testing may be misleading in the context of developing countries. By reviewing the phenotypic spectrum of our own deletion positive patients, we hope to highlight those clinical features which should alert one to the need for FISH testing when resource limitations have to be considered.

Title: **ALCAPA: FROM CRITICAL TO CURED.**

Authors: Liesl Zühlke [1], Rik De Decker [1], John Hewitson [1], Harold Pribut [1], Steve Shipton [2], John Stirling [3], John Lawrenson[1]

Department: [1]Western Cape Paediatric Cardiac Service, University of Cape Town and Red Cross Children's Hospital, University of Stellenbosch and Tygerberg Hospital, Cape Town, South Africa. [2] Division Cardiac Sciences, Sheikh Khalifa Medical City and Cleavland Cinic Abu Dhabi, Abu Dhabi United Arab Emirates. [3] Paediatric and Congenital Cardiac Service, Starship Children's Hospital, Auckland, New Zealand

Anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) is an uncommon congenital heart defect occurring in 1:300 000 live births. It has the unique distinction of a mortality rate of 90% when undiagnosed in infancy yet if diagnosed and repaired timeously, yields excellent survival and functional outcome results.

Although known since the 1800's, many challenges remain in the management of patients with this condition, not least the early recognition of the anomaly. Currently there are various diagnostic modalities available to the cardiologist. Peri-operative strategies and surgical techniques have evolved over time. Children represent a particular challenge as they can present critically ill with profound LV dysfunction, even requiring mechanical support as part of their management.

To assess our diagnostic accuracy, medical and surgical management of these patients as well as reviewing the long-term results after repair, a retrospective review of the 23 patients diagnosed with ALCAPA since 1997 was undertaken.

The average length of time until definitive diagnosis ranged from 11.5 years to immediately at the initial echocardiogram. Only 13/23 patients were catheterised pre-operatively. Of the 18 patients who eventually had surgery, half had a direct re-implantation of the coronary artery and half a Takeuchi repair. Five patients died - 4 early and one late death. Follow-up confirmed excellent outcomes with 90% of patients having normal ejection fractions.

Despite a worse initial presentation in children, timeous ALCAPA repair offers the best potential for full LV functional recovery.

Title: **INDUCED HYPOTHERMIA FOR INFANTS WITH HYPOXIC ISCHAEMIC ENCEPHALOPATHY USING A SERVO-CONTROLLED FAN: AN EXPLORATORY PILOT STUDY.**

Authors: AR Horn, A Bekker, N Rhoda, C Pieper, DL Woods, CM Thompson.

Department: Neonatal Medicine, School of Child and Adolescent Health, University of Cape Town

Background and Objectives: Several trials have shown the benefit of hypothermia in selected infants with hypoxic ischaemic encephalopathy (HIE). Methods of cooling include application of cold packs, caps, blankets or air to the head and/or body. Fan cooling with room-temperature air has been suggested for human infants and used on dogs, but servo-controlled fan cooling with room-temperature air has not been described. The objective of this pilot study was to describe a prototype servo-controlled cooling fan and to define the methods of use and the thermodynamic and haemodynamic impact of this method of cooling on human infants.

Methods: A servo-controlled fan was manufactured and used to cool five infants with hypoxic ischaemic encephalopathy to a rectal temperature of 33 to 34ºC. Infants were sedated with phenobarbitone and clonidine was given if shivering or significant discomfort occurred. A radiant warmer was used in combination with the fan to prevent overcooling. The settings used on the fan and radiant warmer differed slightly between patients as the technique evolved. Infants were cooled for a median of 72 hours. Cooling and re-warming was achieved by setting specific target temperatures on the radiant warmer and fan at defined, repeatable intervals.

Results: A rectal temperature of 34 ºC was achieved within a median time of 59 minutes. Significant overcooling did not occur and the minimum rectal temperature was 32.9 ºC. After a rectal temperature of 34 ºC was reached, the individual standard deviation in temperature varied from 0.1 to 0.2 ºC. The system was entirely automated and repeated adjustments were not required. Heart rate decreased by a median of 36 beats per minute on cooling while mean blood pressure increased in three infants and decreased in two infants on cooling. Blood pressure changes were affected by fan speed in the first three infants. Inspired oxygen requirements increased transiently in four infants during cooling.

Conclusions: Servo-controlled fan cooling with room-temperature air, in combination with servo-controlled radiant warming, is an effective method of inducing and maintaining rectal temperatures of 33 to 34ºC in sedated infants with HIE. Fluctuations in blood pressure and temperature were minimised by using lower fan speeds with small gradients between speeds. This method of cooling may provide a simpler, more controlled and more accurate method of cooling than has previously been described.

Competing interests
A provisional patent of the cooling fan has been registered by the University of Cape Town.
However, the fan is not yet being commercially produced.

Title: **BRAIN INJURY IN CHILDREN – CAN WE MAKE A DIFFERENCE?**

Authors: A.A.Figaji, A.G.Fieggen, A.C.Argent, J.C.Peter.

Department: Paediatric Neurosurgery and Paediatric Critical Care

Injury is the leading cause of death in older children; those with head injury have the highest mortality and survivors are often left neurologically disabled. Secondary injury worsens outcome but the extent of the contribution of secondary injury is uncertain. Most critical care units infer adequate cerebral oxygenation from systemic parameters of monitoring.

Brain tissue oxygenation (PbtO2) is a relatively new technique for monitoring actual brain tissue oxygen tension. Our current protocol seeks to maintain PbtO2 above 20 mmHg; PbtO2 below 10 mmHg is considered to represent critical tissue hypoxia.

Aim: 1) To describe the association of low PbtO2 and outcome in childhood head injury
2) To describe the incidence of low PbtO2 in patients in whom management was optimal by all other parameters.

Methods: Prospective observational pilot study of children with severe traumatic brain injury (TBI) at Red Cross Children Hospital over a 9 month period from June 2006. Multiple parameters of physiological data were recorded. Outcome was dichotomised with the Glasgow Outcome Score (GOS) into favourable (GOS 4-5) and unfavourable (GOS 1-3) outcome. First, low PbtO2 was compared with outcome. Second, the incidence of low PbtO2 was determined for all datapoints where acceptable ICU targets were met for intracranial pressure (ICP), cerebral perfusion pressure (CPP), PaO2 and haemoglobin, i.e. all periods in which these targets were not met were excluded from analysis.

Results: There were 26 patients monitored in this period. There was 1 death (4%); outcome was favourable in 20 (77%) and unfavourable in 6 (23%). The total duration of monitoring analysed was 3217 hours. Low PbtO2 was associated with poor outcome: brain oxygenation was significantly lower during the 'worst' 6-hour period of PbtO2 monitoring in the unfavourable outcome group (p=0.039). Patients in the unfavourable group on average also spent significantly longer time below critical PbtO2 thresholds of 15 mmHg (p=0.009) and 10 mmHg (p<0.0001).

For the time that the nominated conventional targets were achieved, only *20%* of patients had no episodes of PbtO2 below 20mmHg. Almost *one third* of patients had episodes of PbtO2 below 10 mmHg.

Discussion: Low PbtO2 correlates with poor outcome after TBI in children. The most surprising result is the very high frequency of cerebral hypoxia/ ischaemia that occurred after head injury *despite* achieving what is often considered to be acceptable targets by conventional critical care units and published guidelines for head injury management. We contend that conventional monitoring of brain injury is inadequate for preventing secondary cerebral insults in brain-injured individuals, and that most critical care units fail to detect many secondary insults, which may lead to preventable morbidity.

Title: **RESCUE THERAPY WITH HIGH DOSE ORAL PHENOBARBITONE LOADING FOR REFRACTORY STATUS EPILEPTICUS.**

Authors: Jo M Wilmshurst,[1] Sally Ackerman, [1] Jan-Stefan van der Walt[2]

Department: Department of Paediatric Neurology[1], Red Cross Children's Hospital, and Department of Pharmacology[2], GSH

Introduction: Parenteral phenobarbitone was unavailable in South Africa between 2005-2006.

Aim: To establish whether there is a role for oral phenobarbitone in childhood status epilepticus.

Method: All patients admitted in status epilepticus between 12/2005-06/2006 were recruited unless impaired gastric absorption or severe systemic compromise was suspected. Patients received 20mg/kg phenobarbitone via nasogastric tube after benzodiazepine boluses and a phenytoin infusion. Phenobarbital levels were taken post loading with routine blood sampling.

Results: Sixteen patients (7 female:9 male) were assessed, median age 5 months (range 9 days – 168 months). Four patients had epilepsy with breakthrough seizures, all patients had seizures related to underlying infections. Therapeutic levels were confirmed in 14 patients, in five patients by 4 hours. Most patients received 20mg/kg (n=9), the maximum total dosage administered was 80mg/kg with a maximum level of 283 μmol/l. Pharmacokinetic levels extrapolated back suggested therapeutic levels were reached within four hours. Seizure control was documented within 1 hour (n=8), 1½ hours (n=1), 3 hours (n=1) and 4 hours (n=5) following oral phenobarbitone loading. No adverse effects were apparent from the oral phenobarbitone administration despite many of the patients having significant pathology (n=10).

Conclusion: Patients tolerated oral loading with high dose phenobarbitone. Therapeutic levels were attained by 4 hours in a small cohort. This practice is a safe intervention for centres with limited resources and lacking parenteral phenobarbitone. Early therapeutic levels suggested the potential role for oral phenobarbitone in the management of acute status epilepticus as well as prophylaxis against seizure recurrence.

Title: **A REVIEW OF MITOCHONDRIAL ENCEPHALOPATHIES REFERRED TO WESTERN CAPE TERTIARY NEUROLOGY SERVICES BETWEEN 1992 AND 2007**

Authors: Dr G Riordan[1], Dr R Van Toorn[2], Dr J Heckman[3], Prof P Owen[4]

Department: Paediatric Neurology, Red Cross Children's Hospital[1]; Paediatric Neurology, Tygerberg Hospital[2]; Neurology, Groote Schuur Hospital[3]; Division of Laboratory Medicine, UCT Medical School[4]

Objective: The aim of this study was to collate clinical and laboratory data on children and adults with mitochondrial encephalopathy in order to gain information about local prevalence and mode of presentation. This could be used to improve identification and management of these cases.

Methods: Clinical and laboratory findings of patients with confirmed or suspected mitochondrial encephalopathy referred to Western Cape Neurology services from 1992 until 2007 were analysed with regard to age, gender, ethnicity and neurological presentation. Confirmation of the diagnosis was determined by genetic testing for mitochondrial point mutations, deletions, pyruvate dehydrogenase deficiency (PDH); clinical and imaging features of Leigh Syndrome (LS); deficient cytochrome c oxidase (COX) staining on muscle biopsy and clinical and histochemical features of Alpers Syndrome. Patients with suspected mitochondrial disorders had a consistent clinical phenotype with elevated serum lactate or abnormal muscle biopsy and other causes of neuroregression had been excluded.

Results: There were 55 confirmed and 54 suspected cases. 55 were male and 54 female. Of the confirmed cases, 23 were adults and 32 were children. Ancestry was mixed in 17/32, Caucasian in 8, African in 5 and Indian in 2. Age of onset in this group ranged from birth to 15 years with 20/32 presenting before 5 years. All children had developmental delay after onset of symptoms. 15 children had LS. 9 children with LS had indolent courses resembling static encephalopathy, with 4 experiencing rapid deterioration over months, to death between 6 and 9 years. 6 had an aggressive course leading to early death before 2 years of age. In adults, the MELAS A3243G mitochondrial point mutation was most common, occurring in 8 patients.

Conclusion: Local prevalence of mitochondrial disorders is likely to be higher than is reflected in this study, as they are non-specific in presentation and difficult to diagnose. LS presents with low tone, speech and feeding problems and is not possible to diagnose without magnetic resonance imaging. The predominance of LS in paediatric mitochondrial disorders has been reported in other studies. It is both the most common and most life threatening mitochondrial disorder in children and an increased awareness is necessary, as there are important implications for management and genetic counselling. The total number of cases in this study indicates that mitochondrial disorders form a major group of inherited metabolic disease within our patient population.

Title: **THE PAINFUL CHILD**

Authors: Chris Rainier-Pope and Asgar Kalla.

Department: Division of Paediatric Rheumatology, Groote Schuur Hospital,

A retrospective survey of Children with Fibromyalgia.

The aim was to document the fact that Fibromyalgia does occur in children and can be a difficult problem to treat. It was also aimed to show that it occurs across the full ethnic grouping seen in our clinic.

The study was done by going through all the records of patients seen at the Princess Alice Paediatric Rheumatology Unit at Groote Schuur Hospital.

Twenty-six patients (7.6 %) were identified as having Fibromyalgia in a series of 328 patients seen at the Paediatric Rheumatology Clinic since 1998. The diagnosis was based on a modified American College of Rheumatology criteria for children.

The average age of the patients was 11.6 years of which 19 were female and 7 males. Ethnic grouping showed that the majority (73%), would be classified as either coloured (mixed racial) or Indian. 15% black and 11% were white. This represents the normal OPD population of Groote Schuur Hospital. All the patients were initially treated with NSAID‘s alone and the non-responders with a tricyclic antidepressant.

Their clinical presentation, course and the outcome of therapy will be presented.

The condition occurs in all ethnic groups. This has not been previously documented except for Afro Americans. The condition can be difficult to treat with variable results.

Title: **NUTRITIONAL STATUS OF CHILDREN WITH CYSTIC FRIBROSIS AT RED CROSS CHILDRENS HOSPITAL**

Authors: Shihaam Cader[1], Tony Westwood[2],

Department: Dietetics Department[1], Institute of Child Health[2]

Objective: To determine the nutritional status of children with cystic fibrosis over a 20-year period.

Methods: A total of 66 children attend the cystic fibrosis outpatient clinic. Nutrition screening is done every week of each child attending the clinic. All weights and heights were done and analysed using EpiInfo. At the point of time of the study the most recent data were used, without any exclusion criteria. The data was then compared with the available data done in 1986 and 1996 done by Westwood et al. The data looked at the expected weight for height, which indicates wasting and a value less than 90% was classified as malnourished. The expected weight for age and the expected height for age were also included in the study. Data on gender and ethnicity were also collected.

Results: There has been an overall improvement in the nutritional status of cystic fibrosis children. The average percentage expected weight for height in 2006 were 97.9% compared to 89 % in 1986 and 87% in 1996. Even though there was an overall improvement, there were still 15% of the children that were malnourished. However this value has halved since 1996 from a value of 32.4%. The common causes found to be poor appetite related the numerous chest infections, poor compliance/behavioural problems and poor socio-economic status. The expected height for age is an indicator of chronic malnutrition. In this sample there was an overall improvement, however there were still 7 children below the cut-off value of –2.0 SD Z score. With regards to gender and ethnicity, there was no real difference with the nutritional status of these children.

Conclusions: The overall nutritional status of cystic fibrosis has certainly improved. The improved medical treatment, such as early diagnosis and the use of pancreatic enzymes, together with close monitoring of the nutritional status and providing appropriate intervention strategies, are some of the major contributing factors for this improvement. There was however a small percentage of children classified as malnourished, but with the appropriate medical and nutritional treatment these children are improving. A multi-disciplinary team is always needed to maintain the ongoing improvement of all cystic fibrosis children. The nutritional status is important to ensure a good quality of life and prognosis of children with cystic fibrosis.

Title: **AN AUDIT OF THE NUTRITIONAL STATUS AND DIETARY MANAGEMENT OF CHILDREN WITH CEREBRAL PALSY AT RED CROSS CHILDREN'S HOSPITAL**

Authors: Van der Goot M[1], Verstappen[1] S, Marino LV[2], Goddard E[3], van Dijk M[4], Tibboel D[4]
Department: Medical Students, Erasmus MC Rotterdam[1], Department of Dietetics Red Cross Children's Hospital[2], Department of Gastroenterology, Institute of School Child and Adolescent Health, University of Cape Town, [3] Department of Paediatric Surgery, Erasmus MC Rotterdam [4]

Aims: To provide insight into the current nutrition status of children with cerebral palsy at Red Cross Children's Hospital.
Methods: A prospective baseline audit of nutritional status of children with cerebral palsy [CP] was completed during May – June 2007. Trained medical students measured all patients and interviewed their parents/caretakers attending the CP Clinic. Nutritional assessments included a dietary history and measuring anthropometry such as mid-upper-arm-circumference, triceps skin fold thickness, weights and length or by measuring a knee height. For those with a PEG, additional questions concerning the PEG were asked.
Results: The prevalence of malnutrition rate in this group of 259 children as defined by a skinfold tricep thickness of < 10^{th} centile was 75%. However comparative classification of malnutrition < 10^{th} centile for length for age and weight for height is only 5.7% and 8.4% respectively. There is a significant (p=0.002) negative relationship between age and estimated average requirements [EAR]. With increasing age, CP patients have an increased risk of receiving an inadequate amount of calories.

Table 1: Patient Characteristics identified during the prospective audit [n=259]

	N (%)	Median	IQR*	Range
Gender				
Female	111 (46.9)			
Male	148 (57.1)			
Age (years, months)		3,8	2,1-6,3	0,7 - 15,7
Birth weight				
<1000grams	170(65.6)			
1000-1500 grams	39(15.1)			
1500-2500 grams	24(9.3)			
>2500 grams	11(4.2)			
Gross motor function				
I	48(18.5)			
II	35(13.4)			
III	36(13.9)			
IV	43(16.6)			
V	97(37.5)			
Social				
Water and electricity present	231(89.2)			
Road to health card complete	216(83.4)			
Parent s employed	177(68.3)			
Living in special care home	6(2.3)			
Feeding				
Feeding time in minutes		10	10-30	2-120
PEG	14(5.4)			
Age (years, months)				
Age at PEG placement in years		4.3	2.11 – 6.7	1.5 – 14.11
Parents satisfied with PEG	11(78.6)	2	0.5 – 4.5	0-9

Discussion: Despite optimal care in the CP Clinic at RXH, a high rate of malnutrition rate was found, although this varied amongst the different definitions. In this group of children, there is a higher chance of not receiving the advised daily caloric intake with increasing age. Increased awareness of this problem might help to prevent this. To improve the nutritional status, more attention should be given to parental education on feeding. In this process, combined sessions with a dietician and speech therapist may play an important role. The nutritional status in CP patients with a PEG trended towards being better .The placement of a PEG should also be considered more often, since there is indication that this is an effective way to improve the nutritional status of the CP patient.

Title: **REVIEW OF SURGICAL PATIENTS WITH SHORT BOWEL SYNDROME 1998 – 2006**

Authors: Van der Goot M[1], Verstappen[1] S, Marino LV[2], Goddard E[3], van Dijk M[4], Tibboel D[4]

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Aims: To complete a baseline review of surgical patients with short bowel syndrome [SBS] between 1998 – 2006.

Methods: A retrospective folder review. Patients with SBS were identified via operation notes. A medical folder review followed using a proforma to collect information pertaining to primary surgery, events following admission; nutrition support and status in addition to follow up post discharge. Special attention was given to remaining length of bowel, presence of ICV/ colon and whether a stoma had been placed. Issues around type of nutrition support, line sepsis and biochemical abnormalities were also recorded.

Results: Sixty-three patients with SBS were identified between 1998 until 2006. Table 1 provides a summary of the patient characteristics. Most children with SBS were malnourished at the time of their first nutrition assessment [1 – 4 months] with 81% having a weight for age < 10th centile. A follow up assessments completed on average at 15 months indicate that 72% of these children remain malnourished with a weight for age of < 10th centile.

Table 1: Provides a summary of the patient characteristics

***available patients**	N*	percentage	median	IQR	range
Patients					
Female gender	63	44%			
Gestational age (weeks)	38		31	29 – 36	24 – 40
Birth-weight (gram)	39		1260	1100 – 2290	840 – 3880
Operation					
Age at admission (days)	44		13	3 - 29	0 – 118
Age at operation (days)	59		16	4 – 37	0 – 329
Bowel					
Remaining length (cm)	56		68	50 – 83	29 – 95
ICV present	51	82%			
Colon present	51	92%			
Stoma [n = 25]	44	57%			
Stoma closed	25	60%			
Closure stoma after placement (7.5weeks)	15		7	5 - 10	4 - 12
Morbidity					
Sepsis	44	75%			
Jaundice	44	41%			
TPN		93%			
Av time to start [days]		1.97	1 – 9		
Av duration [months]		3.6	1 – 9		
Enteral Feeds					
Av time to start [days]		8.21			
Type of Enteral feed%		88%			
Expressed breastmilk		31.6			
Neocate		23.7			
Pregestamil/Alfare		36.6			
Similac Special Care		5.3			
Pediasure		2.6			
Intra-venous feeding line Inserted	44	52%			
Complications	23	56%			
Outcome					
Time in hospital (days)	50		58	30 - 138	3 – 494
Death	63	37%			
Age at death (days)	23		64	30 - 176	2 – 494

Conclusion: SBS is a complex disease with a high mortality rate. The RXH mortality rate of 37% is comparable to other centres. However, growth and weight gain, in SBS patients at RXH, was not as good. In this study, no obvious predictors for mortality were found. Morbidity rates could potentially be improved by early enteral nutrition support, trophic factors, medication and dietetic counselling Improving post hospitalisation follow up will provide better information on growth and complication rates.

A well functioning system of follow-up, dietetic care, and a home parenteral feeding program could improve survival of SBS patients.

Title: **CYTOMEGALOVIRUS (CMV) INFECTION IN PAEDIATRIC LIVER TRANSPLANT RECIPIENTS AT RED CROSS CHILDREN'S HOSPITAL**

Authors: EA Goddard, CWN Spearman, MI McCulloch, H Burger, A Numanoglu, H Rode, AJW Millar, D Kahn.

Department: Red Cross Children's Hospital, School of Adolescent and Child Health, University of Cape Town, Cape Town, South Africa.

Introduction: CMV is endemic in our population. CMV infection is a common viral infection in solid organ transplant recipients. It causes significant morbidity and mortality and is associated with the degree of immunosuppression and longer hospitalisation.

Aim: To document the problems associated with CMV infection in paediatric liver transplant recipients in a developing country.

Method: A retrospective case analysis of the 88 children (91 transplants) who had received liver transplants at this hospital from December 1987 to August 2007. Management of CMV changed over this period from Acyclovir prophylaxis to short course intravenous ganciclovir and white blood cell filtering of all blood products, to the current protocol of intravenous immunoglobulin, filtering of blood products, prolonged (100 days) intravenous ganciclovir, followed by oral ganciclovir. Induction therapy or the use of monoclonal antibodies is not included in our immunosuppression protocol.

Results: 91 transplants have been done on 88 children (age range: 6 months to 14 years). CMV disease occurred in 7 patients (11 transplants) and CMV infection in a further 14 patients. 5 of the 7 patients with CMV disease died. The site of CMV disease was lung (4), liver (6), pancreas (1) and gastrointestinal tract (1). Initially the diagnosis was made using serology and cultures but from 1995 the CMV pp65 antigen testing became available, from 1996 CMV PCR was included and from 2006 a quantitative CMV PCR was used. Over 90% of the donors and recipients are CMV positive.

Conclusion: As CMV infection is endemic in our region no pre transplant matching is done. No CMV disease or infection has been diagnosed in paediatric liver transplant recipients since the introduction of 100 days of intravenous ganciclovir prophylaxis post transplantation.

Title: **THE PAEDIATRIC LIVER TRANSPLANT PROGRAM AT RED CROSS CHILDREN'S HOSPITAL**

Authors: CWN Spearman, M McCulloch, E Goddard, H Burger, A Numanoglu, P Gajjar, E Muller, F McCurdie, H Rode, D Kahn, AJW Millar

Department: Red Cross Children's Hospital, School of Child and Adolescent Health and MRC / UCT Liver Research Centre, Cape Town, South Africa

Introduction: The liver transplant program for infants and children at the Red Cross Children's Hospital is an established paediatric service. Referrals for liver transplant assessment come from most provinces within South Africa as well as neighbouring countries.

Patients and methods: Since 1987, 87 children (range 5 months – 14 years) have had 90 liver transplants with biliary atresia being the most frequent diagnosis. The indications for transplantation include biliary atresia (52), metabolic (9), fulminant hepatic failure (10), redo transplants (3) and other (16). 6 combined liver/kidney transplants have been performed.
53 were reduced sized transplants with donor: recipient weight ratios ranging from 2:1 to 11:1 and 30 children weighed less than 10kg.

Results: 63 (72%) survive 1 month – 15 years post transplant. Overall cumulative 1 and 5 year patient survival figures are 79% and 70% respectively. However, with the introduction of prophylactic IVI gancyclovir and the exclusion of Hepatitis B virus (HBV) IgG core Ab positive donors, the 1 year patient survival is 90% and the projected 5 year paediatric survival is > 80%. Early (< 1 month) post liver transplant mortality was low (6%) and late morbidity and mortality was mainly due to infections such as de novo hepatitis B, Epstein-Barr virus (EBV) related post-transplantation lymphoproliferative disease and Cytomegalovirus (CMV) disease.

Conclusion: Despite limited resources, a successful paediatric program has been established with good patient and graft survival figures and excellent quality of life.

Title: **A STUDY EVALUATING THE "STATSCAN" DIGITAL X-RAY MACHINE IN PAEDIATRIC CHEST RADIOGRAPHY.**

Authors: R Daya (Junior Researcher), M Kibel, D Pitcher, L Workman, V Saunders, T Douglas

Introduction: The chest radiograph is the commonest radiological examination performed world-wide. A reduction in the radiation dose would have significant advantages for both public health and individual radiation risk. This is particularly true in paediatric practice, where children have an increased risk of radiation-induced malignancy. The radiation dose of a chest radiograph performed on the STATSCAN has been shown to be less than that of conventional x-ray equipment with a computed radiography (CR) system. This study compares the quality of STATSCAN chest films with those taken by CR.

Methods: A random cohort of forty (40) children presenting with signs of chest pathology and who had a CR of the chest taken, were enrolled. Erect AP and lateral chest radiographs were taken with the STATSCAN. Each pair of AP and lateral chest radiographs was printed on standard analog x-ray film after removal of patient details. The images were independently evaluated by a consultant paediatric radiologist and a paediatrician experienced in chest radiology. Reporters were blinded as to which modality had generated the image.

Results: In 27.5% of patients, STATSCAN images demonstrated an exposure artefact, manifest as longitudinally orientated, alternating light and dark bands, extending across the image. This was attributed to fluctuations in scanning speed causing differential exposure. It was termed the "chevron exposure artefact". Average number of anterior ribs visualised on the STATSCAN was 5.8 compared to 6.08 on CR. The average number of posterior ribs on the STATSCAN was 9.53 compared to 9.29 on CR. In 18 cases hyperinflation was diagnosed or suspected on the STATSCAN images, compared to 21 on the CR. The mean CTR on the STATSCAN was 50.33, compared to 50.12 for CR. The hemidiaphragms and ribs were the structures most prone to movement on the STATSCAN images. Movement was demonstrated on 37.5 % of the STATSCAN images and this degraded bronchovascular clarity. No such movement artifact was seen on CR images. STATSCAN allowed superior visualisation of all three major airways. In 25 cases (62.5%) there was diagnostic agreement between the modalities. Correlation was highest for mediastinal pathology (100%) and poorest for diffuse interstitial pulmonary disease (33%).

Conclusions: Compromise to erect STATSCAN image resolution resulted from the chevron exposure artifact and movement artifacts. In a study evaluating the STATSCAN supine AP bodygram in paediatric polytrauma, the chevron exposure artefact was not encountered on the chest projections. The STATSCAN images showed superior visualisation of the trachea and main bronchi, consistent with the findings on the polytrauma study. The STATSCAN showed 100% diagnostic accuracy for mediastinal pathology, although the number of such cases in this study was small. Further work is thus required to define the clinical role of the supine STATSCAN chest radiograph in diagnosis of proximal airway and mediastinal pathology. This may be of particular relevance in countries with a high prevalence of pulmonary tuberculosis, given that the hallmark of paediatric pulmonary tuberculosis is enlargement of mediastinal lymph nodes, with potential distortion of the pliable paediatric tracheo-bronchial tree.

Title: **ACUTE PROMYELOCYTIC LEUKAEMIA TREATED WITH ATRA AND CHEMOTHERAPY AT THE RED CROSS CHILDREN'S HOSPITAL 1992-2005**

Authors: F Desai, M Hendricks, P Hartley, A Davidson

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University of Cape Town

Objective: To review the outcomes of children with Acute Promyelocytic Leukaemia (APL) treated with All-trans-retinoic acid (ATRA) and chemotherapy at Red Cross Children's Hospital between 1992 and 2005 .

Methods: Children were started on ATRA prior to induction chemotherapy. Five children were treated with the MRC AML10 protocol and fourteen with a protocol based on BFM-87. Two died prior to initiation of chemotherapy. Duration of ATRA therapy varied between 15 and 90 days.

Results: Twenty-one children were diagnosed with APL on the basis of blast morphology (100%), immunophenotype (86%), karyotype (81%) or t(15;17) FISH (10%). Age at diagnosis ranged from 3.23 to 13.95 years, with a median age of 7.46 years. There was central nervous system (CNS) involvement in one case. There was evidence of disseminated intravascular coagulation (DIC) in 13 cases and two DIC-related deaths. ATRA syndrome occurred in 6 patients with no fatalities.

Eighteen patients achieved complete remission, two died of DIC and one as a result of infection. Of those who achieved remission, fifteen remain alive and disease free, two have died from infection and the patient with CNS disease relapsed and died. Both deaths from infection in remission were on the MRC AML10 protocol.

Overall 5-year estimated event free survival was 70.8%. Neither a white cell count greater than 10 nor a platelet count below 40 had an impact on survival.

Conclusions: The addition of ATRA to chemotherapy for APL has resulted in outcomes comparable to those reported by major co-operative groups with limited toxicity from ATRA syndrome.

Title: **REVIEW OF A COMMUNITY-BASED DIALYSIS PROGRAM – RED CROSS AND TYGERBERG CHILDREN'S HOSPITAL**

Authors: M McCulloch, P Gajjar, P Nourse, P Sinclair, L Savage, M van der Merwe, H Burger, D Maytham, J Wiggelinkhuizen, G Rijk Van Dugteren, C Morrison, J Michael, G Jacques, N Collison, A Numanoglu, A Alexander, AJW Millar.

Department: School of Child and Adolescent Health, Universities of Cape Town and Stellenbosch

Introduction: Dialysis is accepted standard of care for patients with Chronic Renal Failure (CRF) awaiting a renal transplant. Due to a shortage of available organs, patients may spend a long time on the waiting list. This can be especially difficult in children and infants who require dialysis, with long periods of hospitalisation away from their families and communities. Home-based overnight dialysis allows patients to return home to their families and attend school, only returning to hospital for acute problems and follow up visits.

Aim: Audit of our community-based paediatric peritoneal dialysis program.

Methods: Retrospective folder review of all paediatric patients with CRF receiving chronic peritoneal dialysis (PD) on renal transplant waiting list from 2004 – 2007.

Results: Thirty-eight (38) patients on chronic peritoneal dialysis – 23 based at home, 15 at St Joseph's Children's Home and 1 in-patient at Red Cross Children's Hospital.
Twenty boys and 18 girls with a mean age of 10years (range: 1yr 6months – 17.5yrs).
All children where on overnight automated cycling PD with no daytime dialysis and schooling proceeding as normal.
Patients originated from Cape Town and surrounds in 20, George 2, Eastern Cape 11, Northern Cape 3 and Johannesburg 2 patients.

	Total	**Blood Group O**	**Blood Group A**	**Blood Group B**	**Blood Group AB**
Number of patients	38	13	12	11	2
Time on Dialysis prior to Transplant	8.3mths (0.69yrs)	10mths (0.88 yrs)	6.4mths (0.53yrs)	9.6mths (0.8yrs)	3mths (0.25yrs)

Outcomes	**No of Patients**	**Potential Donors**
Renal Transplants Deceased donor Living related donor (LRD)	 20/38(53%) 7/38(18%)	
Home PD awaiting tx	11/38(29%)	3 patients potential LRD 1 patient LNRD
Conversion to haemodialysis due to peritonitis	3/38(8%)	
Deaths while on PD in community	Nil	

Conclusions: Peritoneal dialysis is a form of renal replacement therapy, which is appropriate for Africa. Community-based PD is possible and practical even in young children and infants allowing re-integration into their families and communities. This also saves in terms of hospital admissions and bed-costs. Laparascopic tenckhoff insertion and salvage techniques have also improved the success of PD. The allocation of a community-nursing sister would assist in family education, decreasing peritonitis episodes and resultant admissions.

Title: **PARENTERAL IRON THERAPY IN PAEDIATRIC PATIENTS WITH CHRONIC RENAL FAILURE**

Authors: Admani B, Nourse P, Gajjar P, Sinclair P, Wiggelhuizen J, McCulloch M.

Department: School of Child and Adolescent Health
Universities of Cape Town and Stellenbosch

Introduction: Parenteral iron therapy is an accepted adjunctive management of anaemia in kidney disease associated with depleted iron stores and compliments the administration of erythropoietin. Most studies have been conducted in adults with very little experience in children.

Objectives: To study the response to parenteral iron in paediatric patients with end stage renal failure

Methods: This study will be a retrospective case review where all patients using parenteral iron will be audited with regard to age, dose of iron, response of haemoglobin and side effects of treatment.

Results: Eight patients in study, 4 male and 4 female with a mean age of 9.9yrs(2-16yrs). Duration of chronic renal failure was 3.7 years (1-7yrs) with 7 of the patients on haemodialysis at time of study. Medication included a mean oral iron dose of 7.1mg/kg (6-9mg/kg/day) and a mean erythropoietin dose 652iu/kg/week (300-1200).
Comparison of iron parameters before and after one month:

Parameters	Baseline Mean	At One Month On Treatment
Hb (mg/dl)	6.5	9.2
Iron	7.5	15.2
Ferritin	116.8	484
TSAT (%)	15.4	34.9
Reticulocyte count	2.2	4.4

Overall 6/8(75%) of patients achieved target Hb of 11g/dl by 60 days.
There were no acute or severe adverse side effects.

Conclusions: Parenteral iron therapy seems to be a safe and effective therapeutic option in children with anaemia in chronic renal failure. This has important implications for other diseases where iron deficiency not responsive to oral therapy or intolerance to oral therapy is a problem.
The use of intravenous iron has had cost saving as well as risk factor implications by the reduction in blood transfusions.

Title: **A REVIEW OF PLASMAPHERESIS IN PAEDIATRIC PATIENTS AT RED CROSS CHILDREN'S HOSPITAL**

Authors: Meredith SP, du Plessis M, Sinclair G, Nourse P, Gajjar P, McCulloch M.

Department: Red Cross Children's Hospital, School of Child and Adolescent Health, University of Cape Town

Introduction: Extracorporeal Plasmapheresis (PP) as a therapy has many indications. Plasma is removed via a membrane filter placed in-line and replaced with either a 5% Albumin solution or homologous fresh frozen plasma or a combination of both. It is a standard and recognised treatment for conditions such as Focal Segmental Glomerulosclerosis (FSGS) and Familial Hypercholesterolemia (FH), while more controversial indications include Guillain-Barré Syndrome, Multiple Sclerosis and poisoning.
Experience with this modality of therapy is well documented in adults, but studies in children are limited. In addition, there are only 2 centres in South Africa capable of performing paediatric PP and for this reason we audited our results.

Objective: Our objective was to audit the PP programme within the Renal Unit and PICU at Red Cross Children's Hospital from 2004-2007.

Methods: A retrospective analysis of patients who received PP between 2004 - 2007 was performed. Patient's age, diagnosis, number of sessions, adverse events, response to therapy and overall outcomes were recorded.

Results: 9 patients received PP with age ranges from 1yr to 15 yrs (mean age 6.4 yrs). 2 patients had recurrent atypical Haemolytic Uraemic Syndrome (HUS), 6 had focal segmental glomerulosclerosis (FSGS), and 1 had FSGS and Familial Hypercholesterolemia (FH) combined. 146 sessions were performed (min 3 max 51, mean 16.2) Successful therapy with complete remission was achieved in 3/5 FSGS patients and partial response in 2/5 FSGS patients due to initiation of therapy at a very late stage in the disease. Varied responses were seen in the 2 HUS patients, in keeping with other studies. Excellent response was seen in the single FH patient.
3 paediatric trained haemodialysis technicians performed PP without any significant adverse events despite critically ill patients. An adaptation with PP being used simultaneously with haemodialysis was implemented.

Conclusion: Despite small sample numbers, PP even in the most critically ill infant is possible when performed in a dedicated paediatric renal unit. PP remains a viable life saving and a cost effective treatment option, especially when used simultaneously with haemodialysis (HD).

Title: **REVIEW OF A STEROID WITHDRAWAL REGIME IN PAEDIATRIC RENAL TRANSPLANT RECIPIENTS: 3 CASE REPORTS**

Authors: Gajjar P, McCulloch M, Savage L, Burger H, Van Der Merwe M, Numanoglu A, Muller E, Khan D

Department: Renal Unit, Red Cross Children's Hospital, Cape Town

Background: Review of an international multicentre study to investigate the safety and efficacy of a steroid withdrawal protocol, using Tacrolimus, Mycophenolate Mofetil and Daclizumab vs. Tacrolimus, Mycophenolate Mofetil and Steroids, after kidney transplantation. The Primary Endpoint of this study was assessment of growth (change in height from baseline), as growth is probably the most important benefit of a steroid-free regime. Six potential patients were initially identified for the study. Two were excluded, a third not enrolled, as she had Pulmonary Tuberculosis 18months prior to her transplant. The three patients enrolled were all randomized to the steroid withdrawal arm. They received, as per protocol, (i) Methylprednisone at 300-60mg/m^2 on Day 0 followed by a weaning dose of 60 to 20mg/m^2 from Day 1 to Day 4 only, (ii) Tacrolimus 0,15mg/kg per dose BD aiming for levels 10-20ng/l for the first three weeks and then 5-15ng/l thereafter; and (iii) Mycophenolate Mofetil at 600mg/m^2 per dose BD for the first 14 days followed by 300mg/m^2.

Aim: To document (i) growth and (ii) morbidity observed in three patients on the steroid withdrawal arm, which involves the use of a stronger immunosuppressive regime, in the South African setting. All three patients received a kidney from either parent. All three donors were EBV and CMV IgG positive.

Results:

	Patient C.B (male)	**Patient J. C.(male)**	**Patient Y.M.(female)**
Age at time of Transplant	8yrs	16yrs	4yrs
Race	Mixed Race	White	Black
Underlying Renal disease	Unknown	Vesico-ureteric reflux, Dysplastic kidneys	Unknown
Premorbid state	Peritoneal dialysis (PD)	Ureters reimplanted	On PD/ Presumed TB, treated
CMV and EBV status	CMV + EBV +	CMV – EBV +	CMV + EBV +
Creatinine Day 7	40 umol/L	465 umol/L	25umol/L
Change in height from baseline	+ 2.5cm	N/A	+2.2cm
Side effects and drug toxicity	Nil	Tacrolimus toxicity and graft loss	Gastro / Biopsy proven Tacrolimus toxicity
Infections post-transplant	Urinary Tract infection Polyoma virus +	N/A	CMV infection
Management	Reduction of Immunosuppression	Trial aborted	Gancyclovir IVI, Valgancyclovir prophylaxis

Conclusion: The steroid withdrawal regimen has advantages as growth is preserved despite the short duration of follow up. The use of stronger and more aggressive immunosuppressive regimen however requires vigilance, as it predisposes to infections as well as Tacrolimus toxicity with increase risk of graft failure and graft loss

Title: **EARLY CHILDHOOD CARIES AT MITCHELL'S PLAIN AMONG CHILDREN 12-24 MONTHS**

Authors: Dr. M Mustafa Ali & Dr. S Y Harnekar

Objectives: To assess early childhood caries (ECC) in children 12-24 months in the Mitchell's Plain district of the Western Cape by recording:

- The prevalence and pattern of early childhood caries.
- The relation between early childhood caries and infant feeding habits.
- The relation between early childhood caries and oral hygiene habits of the child.

Methods: This study is a cross sectional study of ECC of children 18-24 months of age. Parent/guardian and child pairs attending Eastridge well baby clinic at Mitchell's Plain were informed about the study and invited to participate on a voluntary basis.
The data collected consisted of a dental examination and a questionnaire.
The dental examination of 120 children (stratified by age) was conducted using the World Health Organization (WHO) guidelines (Geneva 1997). The child's age, tooth status (sound, decayed, filled, extracted, unerupted), and visible dental plaque on maxillary incisors (Spitz et al, 2006) were recorded.
The questionnaire was completed by interviewing the accompanying parent/guardian. The questionnaire consisted of closed questions about breast feeding, bottle feeding, and oral hygiene habits of the child.

Results: The prevalence of ECC for the whole sample was 23.3% and mean dmft =0.88; for 12-18 months 10% (dmft=0.27); and for 19-24 months 37 % (dmft =1.48). For the whole sample the maxillary incisors had the highest prevalence of decay (14%) followed by the maxillary molars (4%).

The nursing practice was as follows; 23% exclusive breast feeding, 13% exclusive bottle feeding, and 63% both breast and bottle feeding. There was no statistically significant difference between the nursing practices and the caries experience or the plaque scores.

In children bottle fed the prevalence of decay was 10.6% for those fed 12 months or less and 40% for those fed more than 12 months. There was a strong association between the duration of bottle feeding and the presence of caries ($P<0.01$).

Visible dental plaque on maxillary incisors was prevalent in 67.5% of the whole sample while in children with decay it was 96.4%.
48% claimed to have a tooth brushing habit, 38% used other methods and 14% reported not cleaning the child's mouth. No correlation was found between oral hygiene habits and caries prevalence.

Conclusion: There is a high prevalence of Early Childhood Caries (37%) in the 19-24 months group.

- Early Childhood Caries was related to prolonged bottle feeding (>12 months).
- The presence of dental plaque was the most significant risk indicator for ECC (P= .000).

Title: **CHALLENGES TO BEST PRACTICE AROUND THE CARE OF SICK NEONATES IN A GENERAL WARD**

Authors: Jeanne Coetzee, Minette Coetzee, Anchen Verster, Weez Bramwell

Department: Child Nurse Practice Development Initiative, UCT School of Child and Adolescent Health

The two neonatal wards, F1 and F2 were closed due to resource constraints in the late nineties. Neonates were then admitted to general wards. While most wards were committed to accommodating these infants in one cubicle, the practical issues around staffing and bed allocation of various specialities often means that they are moved around to suit the wards accommodation and staffing needs. This is also the situation in ward E2.

The knowledge and evidence base around the care of sick neonates has exploded in the last decade. Significant research into neurological development has resulted in what is termed developmental care of neonates. It is a practice which is easy to implement in neonatal units but in the context of a busy specialist ward it certainly poses more challenges.

The Child Nurse Practice Development Initiative was established at the Red Cross Children's Hospital to create a forum where the complex issues surrounding the practical nursing care of children can be explored. The project's purpose is to enable nurse teams to consider their current practice and to identify aspects which they can improve using a participative action research process.

In ward E2 our aim was to assess our current practice so that we could improve our care of neonates in the ward. This poster will present the outcomes of this project to date.

Title: **WORKING WITH SICK CHILDREN – DESCRIPTIVE EVALUATION OF THE FIRST THREE YEARS OF A TRAINING PROGRAMME AT RED CROSS CHILDREN'S HOSPITAL**

Authors: Minette Coetzee, Weez Bramwell

Department: Child Nurse Practice Development Initiative, UCT School of Child and Adolescent Health

In 2004 a Teaching and Learning Needs Analysis of nurses at Red Cross Children's Hospital indicated a need for additional training of current staff in working with sick children. This need had arisen because undergraduate and pre-registration nursing education in South Africa is adult based and diminishing numbers of nurses have a post basic paediatrics qualification. The significant loss of experienced nurses in the preceding ten years as well as continuing migration and retirement of nurses with experience in working with children resulted in the need for an accessible practice-based module.

The key differences between nursing adults and children are not only technical but also revolve around understanding and anticipating different behavioural responses of children at different developmental stages. The presence of anxious parents, different work routines and organisation also add challenge to the care of sick children. A 5-day module was developed and has been offered every two months for the last three years and 180 nurses have attended the module.

The module augments courses offered in the hospital nursing education department and it aims

- to facilitate an understanding of the development and behaviour of sick children
- to offer the nurse the tools to communicate, in the best possible way, with children and their families in times of being ill and hospitalised.

Practical application and skills development are included.

This poster will present the demographic data of these participants as well as a descriptive analysis of the evaluation process of this intervention.

Title: **REVIEW OF DOG BITES IN SMALL CHILDREN**

Authors: Dwyer J, N du Toit, P Nyakaza, S Fisher*, AB van As

Department: Child Accident Prevention Foundation of Southern Africa
*Safekids Worldwide

Introduction: Dog bites are a major cause of preventable traumatic injury in the paediatric population. To accurately determine the epidemiology of dog bite injuries in children in view of developing potential preventative strategies, we conducted a 13.5-year retrospective review of patients with dog bite injuries presenting to our tertiary paediatric trauma unit.

Aims/Objective: To perform an analysis of dog bites in our community in order to develop preventative strategies.

Materials/Methods: Retrospective study of paediatric patients who suffered dog bite injuries presenting to the Trauma Unit of the Red Cross War Memorial Children's Hospital (RCH) in Cape Town, South Africa, from March 04, 1991 to October 25, 2004.

Results: A total of 2025 dog bite injuries were sustained by the 1871 children. The majority of injuries (n=1626, 80%) were classified as minor. Children less than six years of age were more likely to sustain injuries to the head, face or neck (n=421, 49%), whereas children greater than six years of age more commonly received injuries to the thigh or leg (n=560, 48%). The most frequent injuries were superficial lacerations and only 38 (2%) of children required major surgery.

Conclusions: This is one of the largest epidemiological studies of dog bite injuries in children reported. The causes were found to be multifactorial and possible preventative strategies should adopt a multidisciplinary approach aiming to modify behavioural patterns of the pet owner, child and dog. Health practitioners should actively contribute to responsible dog ownership and provide evidence-based dog bite prevention information

Title: **OPTIMIZATION OF AN 8-COLOUR FLOW CYTOMETRIC INTRACELLULAR CYTOKINE STAINING ASSAY TO DETERMINE BCG-INDUCED IMMUNE CORRELATES OF PROTECTION AGAINST TUBERCULOSIS.**

Authors: Benjamin Kagina, Brian Abel, Thomas Scriba, Willem A. Hanekom

Department: South African Tuberculosis Vaccine Initiative (SATVI), Institute of Infectious Diseases and Molecular Medicine and School of Child and Adolescent Health, University of Cape Town.

Background: Bacille Calmette-Guérin (BCG), the only vaccine currently available for the prevention of TB disease, has limited efficacy. Our primary aim is identifying BCG-induced immune correlates of protection against TB disease; this knowledge will guide novel TB vaccine development. Here we describe the use of multi-parameter flow cytometry (MFC) to dissect distinct subsets of cytokine-producing specific T cells which correlate with protection in BCG-vaccinated infants.

Methods: Based on hypotheses of protective immunity in tuberculosis, we elected to evaluate expression of IL-2, IFN-γ and TNF-α (Th1 cytokines), IL-4 and IL-13 (Th2 cytokines) and the regulatory cytokine IL-10 in mycobacteria-specific CD4+ and CD8+ T cells of 10-week old infants, routinely vaccinated with BCG at birth. Whole blood was incubated with BCG for 12 hours, lysed and fixed before cryopreservation followed by Intracellular Cytokine Staining (ICS). When measurable, cytokines were incorporated into a MFC panel. This involved further optimization, such as selection of appropriate antibody-fluorochrome conjugates, titration of antibodies, evaluation of spectral overlap and optimal compensation, and devising optimal gating and analysis strategies. The intra-assay coefficient of variation of the assay, defined as a measure of assay reliability, was then determined using blood from 5 donors.

Results: We showed that IL-2, IL-17, IL-22, TNF-α and IFN-γ were within a range of detection in CD4+ and CD8+ T cells (ranges 0.028 – 0.709% and 0.024 – 0.197%, respectively). IL-4, IL-10 and IL-13 were at very low ranges (mostly <0.02%), which would require much larger blood volumes than those available from infants for reliable analysis, and were therefore excluded in the panel. A panel of CD3PacBlu, CD4Cy5.5PerCP, CD8FITC, IL-2PE-Alexa610, IL-17Alexa647, IL-22PE, IFNgAlexa700 and TNFCy-7PE was optimized. The panel worked well in pilot experiments – results will be shown. The median intra-assay coefficient of variation for the panel was calculated to be 7.9% (5.0 - 16.3%), and the background levels from unstimulated whole blood are <0.04% for all cytokines analyzed.

Conclusions: We were successful in developing a robust and reproducible whole blood assay ICS of T cell immunity induced by BCG. We will now apply this assay to samples from our large immune correlates study. 5,675 infants vaccinated with BCG at birth were enrolled, and at 10 weeks of age, whole blood was collected from each infant, incubated with BCG or control antigens for 12 hours, and subsequently cryopreserved. Infants were followed for at least 2 years to identify cases with TB disease (n=45), and controls that were protected from developing TB despite exposure to adults with disease (n=91). We hypothesize that the pattern and frequency of specific cytokine production of T cells will differ between the 2 groups.

Title: **PENICILLIN ALLERGY IN CHILDREN – OFTEN MISDIAGNOSED?**

Authors: S. Karabus, B. Joshua, C. Motala

Department: Division of Allergy School of Child & Adolescent Health, UCT & Red Cross War Memorial Children's Hospital (RCWMCH).

Background: In the paediatric population, cutaneous eruptions which occur in patients during the course of treatment with penicillin and semi-synthetic penicillins maybe incorrectly diagnosed as allergic reactions to these drugs. In most of these cases, the diagnosis of penicillin allergy is not verified. Therefore, many patients could be inappropriately labelled as "penicillin allergic", end up carrying the label into adulthood and be frequently treated with alternate antibiotics that may be more toxic, less effective and more expensive.

Objective: The aim of this retrospective study was to determine the relative prevalence of allergic and non-allergic reactions to penicillin in children with self-reported allergy to this drug.

Methodology: Clinical and laboratory data of children referred to the Allergy Clinic RCWMCH for evaluation of suspected penicillin allergy between July 2002 and June 2007 was reviewed. *Clinical data* included: sex, age at first reaction, interval between ingestion of drug and onset of reaction (<1 hour = immediate; 1-72 hours = intermediate; >72 hours = delayed), nature of the adverse reaction, the interval between the reaction and testing, and presence of co-existing atopy. *Tests for penicillin allergy* included: CAP-RAST ® (for penicillin V, penicillin G, ampicillin, and amoxil), skin prick tests (SPT) to major antigenic determinants of penicillin (penicillin G and penicilloyl) and minor antigenic determinants (penicilloate and penilloate), and penicillin challenge testing (only performed in patients with negative skin prick tests). Subjects were confirmed as *"penicillin allergic"* if they tested positive by CAP-RAST or SPT; those that tested negative by CAP-RAST, SPT and penicillin challenges were regarded as *"non-penicillin allergic"*. Follow-up: medical records checked and telephonic contact made with non-penicillin allergic patients to determine if any adverse events occurred after subsequent treatment with penicillin.

Results: Data of twenty subjects (11 males, 9 females) was analyzed. Penicillin allergy was confirmed in 5/20 (25%) subjects (*Allergic Group*)-four were SPT +ve, two CAP-RAST +ve (includes the patient with anaphylaxis). The median age at first reaction for this group was 6 years (range 1,5–10years). All subjects were atopic. 5/5 (100%) presented with urticaria ± angioedema (one with anaphylaxis)-the reactions were "immediate" in all cases. The median time interval between the reaction and evaluation for this group was 2 months (range 1–4 months).

Penicillin allergy was excluded in 15/20 (75%) subjects (*Non–Allergic Group*)–all diagnostic tests were negative. The median age at first reaction was 2,5 years (range 1,5–11 years); only 3/15 (20%) were atopic. 6/15 (40%) presented with a maculopular rash, 6/15 (40%) with urticaria ± angioedema and 3/15 (20%) with an unidentified rash-reactions were "immediate" in 6/15 (40%), "intermediate" in 3/15 (20%) and delayed in 6/15 (40%). The median time interval between the reaction and evaluation for this group was 20 months (range 4–60 months). All non–allergic patients subsequently received penicillin without any adverse events.

Conclusions: Allergic reactions to penicillin, anaphylaxis in particular, are relatively infrequent in the paediatric population. SPT and challenge testing (if SPT is negative) are essential for confirming or refuting the diagnosis of penicillin allergy (except in cases of anaphylaxis when CAP-RAST is recommended-safer) - the "history" on it's own maybe unreliable-often poorly documented or vague. Clinical manifestations of the allergic reaction may also be non-specific. Accurate diagnosis is essential to avoid the morbidity, mortality and economic cost associated with unnecessary withholding of penicillin therapy in non–allergic patients.

Title: **EFFECT OF HIV INFECTION ON T CELL SUBSET DISTRIBUTION OVER THE FIRST YEAR OF LIFE.**

Authors: Nazma Mansoor, Brian Abel, Marwou De Kok, Jane Hughes, Michelle Tameris, *Gilla Kaplan Tony Hawkridge, Gregory Hussey, Willem A Hanekom.

Department: The South African TB Vaccine Initiative, Institute for Infectious Disease and Molecular Medicine and School of Child and Adolescent Health, University of Cape Town
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Aim: To Measure changes in T cell subset distribution in children over the first year of life

Methods: Participants were enrolled into a project to determine the effect of HIV infection or exposure on the immune response induced by newborn Bacillus Calmette Guerin (BCG) vaccination. The protocol of the latter study allowed the complementary immunological investigation reported here. Infants born to HIV-infected and non-HIV-infected women from the Worcester region of the Western Cape, South Africa, were enrolled before the age of 3 months. At this age, infant HIV infection status was determined by PCR, and each was classified into 1 of 3 groups: non-HIV-infected born to a non-HIV-infected mother (HIV-), non-HIV-infected born to a HIV-infected mother (Exposed HIV-), or HIV-infected (HIV+).
We collected blood from these infants at at 3, 6, 9 and 12 months of age and measured expression of CD45RA, CCR7, CD62L, CD57, CD25 and CD28 on CD4 and CD8 T cells with flow cytometry. This study was performed prior to introduction of antiretroviral therapy in South Africa.

Results: HIV+ infants had low frequencies of naïve and high frequencies of memory CD8 T-cells at 3 months of age already (e.g., a median 23% of CD8 cells expressed both CD45RA and CCR7, compared with 67% and 59% in the 2 control groups, respectively). HIV+ infants also had markedly lower expression of CD28 (60%, vs. 93% and 87%, respectively), and higher expression of CD57. These differences became progressively more marked over the first year of life.
Similar trends were shown for CD4 T cell memory populations. Interestingly, there were no differences in frequencies of CD4+CD25+ cells between the groups.
Although immune alterations have previously been shown in HIV-exposed but uninfected infants, we found no significant differences in these subsets, when compared with HIV-unexposed infants.

Conclusion: We concluded that HIV+ infants had high frequencies of memory T cells that appeared terminally differentiated, and which had low expression of costimulatory markers, from very early in life. These changes became progressively more pronounced over the first year of life.

Title: **COMPARISON OF BODY SURFACE AREA-BASED DOSING AND A SIMPLIFIED WEIGHT-BASED DOSING METHOD FOR ZIDOVUDINE, DIDANOSINE, NEVIRAPINE AND LOPINAVIR/RITONAVIR IN CHILDREN STARTING ANTIRETROVIRAL THERAPY**

Authors: J. Nuttall, B. Eley, M-A. Davies

Department: School of Child and Adolescent Health and Red Cross Children's Hospital, University of Cape Town, South Africa

Background and Objectives: Although standard paediatric dose recommendations for the antiretroviral drugs zidovudine, didanosine, nevirapine and lopinavir/ritonavir are based on body surface area (BSA), the World Health Organisation (WHO) has recently published simplified weight-based dosing tables for these drugs. The objective of this study was to assess how accurately the WHO dosing method reflects BSA-based doses using anthropometric data from a cohort of children starting antiretroviral treatment.
Methods: We compared the calculated BSA dose range with WHO weight-based doses for zidovudine, didanosine, nevirapine and lopinavir/ritonavir using actual heights and weights of children at the time of starting antiretroviral treatment between August 1998 and July 2006 at our hospital.
Results: There were 601 children (55% males) and the median age (IQR) was 28 months (13-62). Fifty-nine percent of children were moderately or severely underweight (weight-for-age Z-score ≤-2); sixty-three percent were moderately or severely stunted (height-for-age Z-score ≤-2). For zidovudine, nevirapine and lopinavir/ritonavir suspensions, weight-based dosing under-dosed relative to the calculated BSA dose range in <2%, 0% and 1.2% of children respectively. Over-dosing relative to the calculated BSA dose range occurred with nevirapine suspension (all weight categories) and lopinavir/ritonavir suspension (8/13 [62%] of weight categories) but not with zidovudine suspension. Weight-based dosing using capsules (zidovudine, lopinavir/ritonavir) or tablets/fractions of tablets (didanosine, nevirapine) was generally more frequently associated with both under-and over-dosing relative to BSA doses than suspensions.
Conclusion: In this group of children, the WHO simplified weight band dosing method effectively avoided under-dosing children in relation to existing BSA dose recommendations with respect to zidovudine, nevirapine and lopinavir/ritonavir suspensions. The risk of both under-and over-dosing is greater with weight-based recommendations on existing capsule or tablet formulations of these antiretroviral drugs. Further studies are needed to assess safety and efficacy using the WHO weight band dosing method for children in resource limited settings.

Title: **DATA-MINING CHILD TRAUMA SURVEILLANCE SYSTEMS AS PART OFF INJURY PREVENTION**

Authors: P Nyakaza, AB van As, S Fisher *, G Dragosavac, N du Toit, AJW Millar

Department: Child Accident Prevention Foundation of Southern Africa
*Safekids Worldwide

Introduction: Trauma is the leading cause of morbidity and mortality in children across the globe and a huge public health problem in South Africa. The aim of the Child Accident Prevention Foundation of Southern Africa (CAPFSA) is to reduce all intentional and un-intentional injuries of all severity through research, education and environmental change and to produce recommendations for legislation.

Aims/Objective: To study patterns and trends from all trauma patients presenting to Red Cross Children's Hospital with the ultimate goal of accident prevention.

Materials/Methods: We explored our 14 year old electronic database on child trauma with novel advanced data-mining methods.

Results: Over 90 000 child accidents were analysed. The most common injuries were falls (n = 32766). Surprisingly, from all seriously injured children 39,4% fell from the bed, while only 2.8% fell from playground equipment. The second most common cause was traffic accidents (n = 11915). Motor vehicle accidents involving a pedestrian were the most common with 64.2% (n = 7645). Bicycle accidents were second with 15.3% (n = 1819), passenger motor vehicle accidents third with 13,7% (n = 1630). 7241 patients presented with burns, of which 72,1% were fluid burns, 11,7% were due to flame burns. From all serious burns, 44,4% were due to flame burns.

Conclusions: Data-mining is a powerful and promising tool in the third millennium. Close co-operation between information technologists, data-collecting clinicians and injury prevention workers could prove to be an exciting pathway in the future of injury control.

Title: **DENTAL VISIT PATTERNS OF PARENTS BRINGING CHILDREN FOR DENTAL TREATMENT**

Author: Ms Karen Paulse (BOH student)

Objective: To determine: a) the knowledge, attitudes and practices of parents bringing children aged five and below to the Diazville Dental clinic and b) the dental health status of the children attending the dental clinic.

Methodology: The study population was a convenient sample of children attending the Diazville Dental clinic for dental treatment. Parents/caregivers were invited to participate, informed that they could withdraw from the study at any time and that the information would be anonymous. An administered questionnaire for parents/caregivers bringing the children to the clinic was used to gather data. The variables measured included: the demographic data of the parent/caregiver, their level of education and income, the reason for the visit, past dental experiences of the child, preferred treatment, knowledge of dental caries and the management thereof, impact of dental problems on quality of life and hygiene practices. A dental screening of the children was done. The variables measured were: the decayed (d), missing (m) and filled (f) teeth; the presence of visible plaque; the presence of gingival inflammation. The SPSS statistical package was used for data entry and analysis.

Results: Almost half (45%) of parents are unemployed. The majority of parents have only experienced extractions (85%). The children's (n=22) ages ranged from 2 -5 years, the reason for the visit was for an extraction, mainly due to pain. Knowledge of parents/caregivers indicated that caries was related to eating sweet things or sugar, the treatment of caries was extractions, also their preferred treatment for that visit. Most parents/caregivers felt that their children's mouth was in a fair to good condition. Children have experienced not being able to sleep at night (55%), difficulty in eating (35%), being teased (22%) in the past 6 months because of dental problems. Parents treat their children's dental problems with home remedies such as clove oil and medicaments such as panado syrup or dispirin dissolved in water. Children are brought to the dental clinic when they are symptomatic. Almost half (47%) of children are responsible for cleaning their own mouths. The dental status indicated: a mean decayed (d) score of 5, a mean missing (m) due to caries score of (2), no filled teeth. There was no inflammation noted. Visible plaque was seen in 14% of children.

Conclusion: The dental visit pattern of parents, their attitudes and knowledge, and the hygiene practices of their children will perpetuate a pattern of dental visits when symptomatic and extractions as the choice of treatment. This does and will continue to affect the quality of life of these children. A comprehensive health/oral health promotion is required for this community.

Title: **CYTOKINE AND PHENOTYPIC PROFILES OF T CELLS INDUCED BY NEWBORN BCG VACCINATION.**

Authors: Andreia Soares, Thomas J. Scriba, Gregory Hussey and Willem Hanekom.

Department: South African TB Vaccine Initiative, University of Cape Town, South Africa.

Bacillus Calmette-Guerin (BCG), the only currently available TB vaccine, is the most widely administered vaccine in the WHO Expanded Programme on Immunization. However, the immune response to BCG has not been fully characterized. This knowledge is critical for studies of protective immunity induced by vaccination and for developing novel, improved TB vaccines.

We aimed to describe phenotypic and cytokine profiles of mycobacteria-specific T cells in the peripheral blood of 10-week old infants, following their routine vaccination with BCG at birth.

Infant whole blood was incubated with BCG for 12 hrs; Brefeldin A was added for the last 5 hrs. Red cells were lysed and white cells fixed and cryopreserved. Thawed cells were permeabilised, stained and analysed by polychromatic flow cytometry.

We observed predominant expression of presumably protective Type 1 cytokines. IFN-γ was most frequently detected; however, multiple distinct Type 1 CD4+ and CD8+ T cell subsets could be identified, based on IL-2, TNF-α and/or IFN-γ co-expression. These specific T cells had a predominant effector phenotype, i.e., CD45RA-CCR7-CD27+. IL-2 expressing T cells were more likely to have a central memory phenotype, i.e., CCR7+, compared with IFN-γ+ T cells.

We conclude that newborn BCG vaccination induces predominantly Type 1 cytokine responses in CD4+ and CD8+ T cells. A number of T-cell subsets do not produce IFN-γ, suggesting that assays relying on detection of this cytokine alone underestimate the magnitude of the mycobacteria-induced response. Type 1 cytokine expressing CD4+ and CD8+ T cells have predominantly effector phenotype, suggesting persistence of BCG. We will use our results to guide analysis of studies to determine longitudinal changes in immune responses induced by BCG, and to determine BCG-induced immune correlates of protection against TB.

Title: **BASELINE DATA FOR AN ORAL HEALTH INTERVENTION FOR CHILDREN ATTENDING A PHC FACILITY**

Author: Ms Heidi Van Wyk (BOH student)

Objective: The determine baseline data in order to develop an oral health promotion intervention for children attending the immunization clinic at Lentegeur Dental Clinic.

Methodology: The study population was a convenient sample of children attending the immunization clinic for their nine month or 18month visit. Parents/caregivers were invited to participate, informed that they could withdraw from the study at any time and that the questionnaire would be anonymous. An administered questionnaire for parents/caregivers bringing the children to the clinic was used to gather data. The variables measured included: the demographic data of the parent/caregiver, their level of education, oral hygiene practices of the children, feeding practices of the children and oral health related knowledge of parents/caregivers. A dental screening of the children was done. The variables measured were: the decayed (d), missing (m) and filled (f) teeth; the presence of visible plaque; the presence of gingival inflammation. The Excel statistical package will be used for data entry and analysis.

Results: Most parents had a high school education. The children's (n=24; 16=9months and 8=18months) ages ranged from 9-18months. Most are being cared for by their mothers. Parents/caregivers primarily use a cloth the clean the child's mouth (68%); start cleaning at or after nine months; 50% cleans twice per day. Most (72%) are bottle fed in addition to breast feeding and or the feeding cup, 35% add sugar to the feeding bottle. Parents/caregivers have inadequate knowledge on how to maintain the oral health of their children. The dental status of the children indicated that: 7 did not have any teeth, 3 children had four carious teeth and a number of children had visible plaque on their maxillary incisors.

Conclusion: Parents/caregivers have inadequate knowledge to maintain their children's oral health, the hygiene and feeding practices indicate that children are at risk for early childhood caries. An oral health promotion intervention focusing on feeding and hygiene practices and dental visits to coincide with the immunization visit at Lentegeur clinic is suggested.